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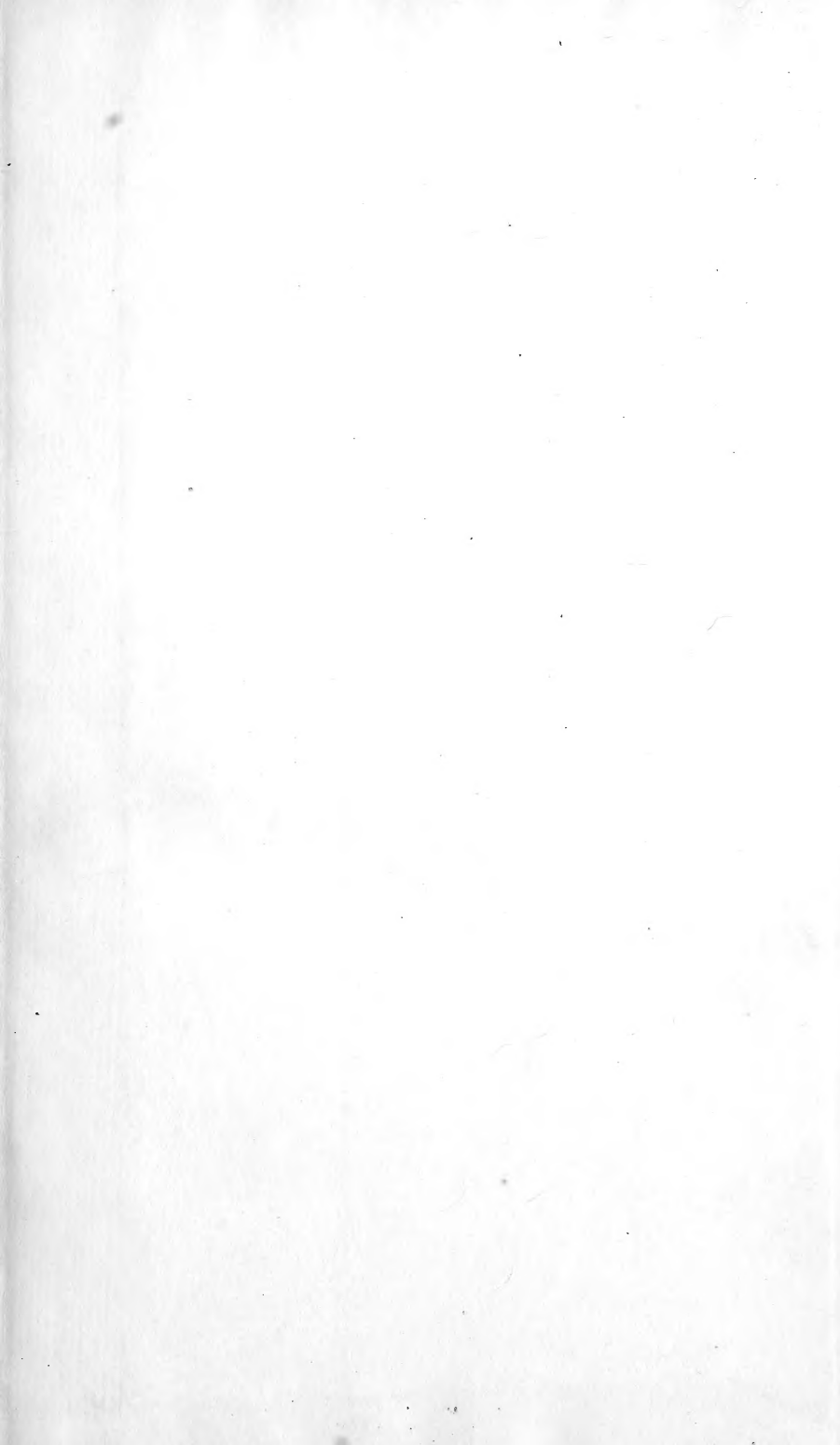


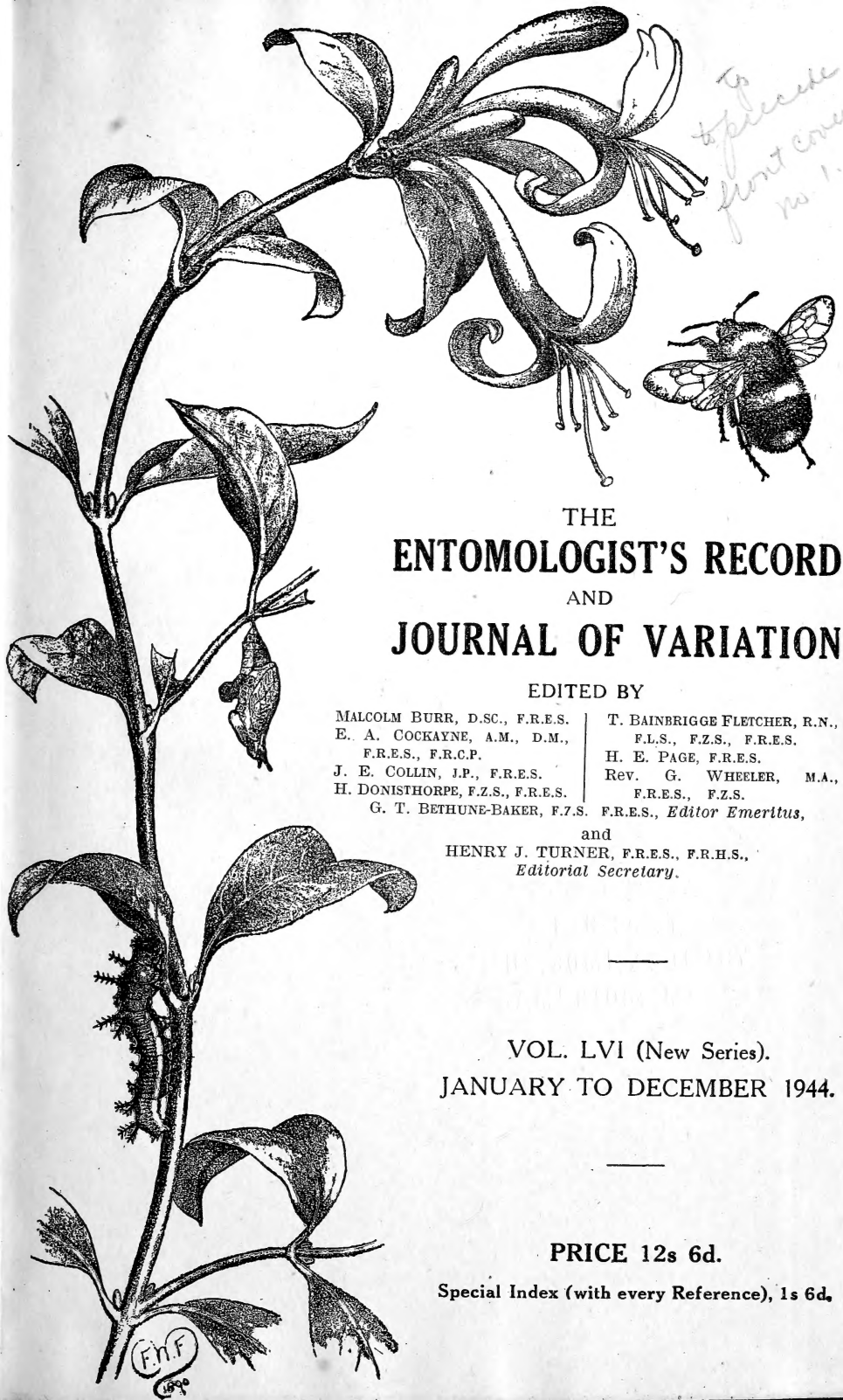
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THE
ENTOMOLOGIST'S RECORD
AND
JOURNAL OF VARIATION

EDITED BY

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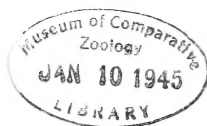
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SPECIAL INDEX.

By HY. J. TURNER, F.R.E.S., F.R.H.S.

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The Entomologist's Record and Journal of Variation.

Coleoptera arranged in order of Genera. The other Orders arranged by Species. Genera, Species, etc., new to Britain are marked with an asterisk, those new to Science with two asterisks. [Only those species are indexed, which have some biologic fact attached, or are uncommon.]

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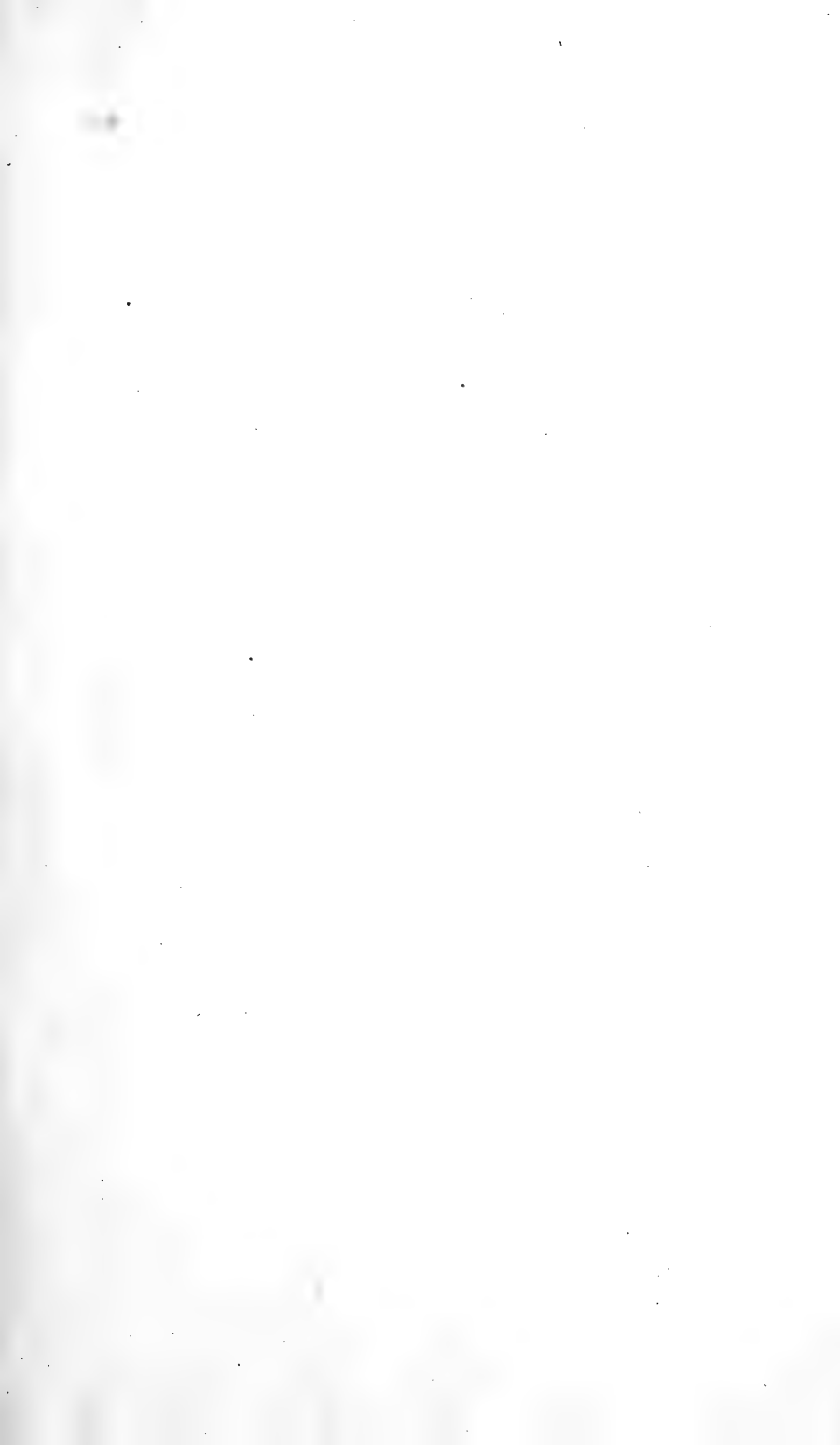
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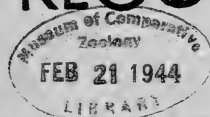
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VOL. LVI.

15TH JANUARY 1944.

No. 1.

THE WHITEHOUSE SALE OF BRITISH LEPIDOPTERA.

On 16th November 1943, at Glendining's Auction Rooms in London, was sold the first portion of the fine collection of British Lepidoptera formed by the late Sir Beckwith Whitehouse, President of the British Medical Association, a keen and energetic entomological collector.

A considerable number of the specimens listed were only recently acquired from the "Bright" collection, and it is a tragedy that the Professor should have enjoyed the sight of the insects for so short a time. His sudden death, practically in the prime of life, was a shock to his numerous friends by whom he will be greatly missed.

Amongst the buyers were some newcomers, whose names are not familiar to the entomological world. Rumour says that some of the insects are ultimately doomed to seclusion in a remote provincial Museum, where they will be lost to sight, and this perhaps may be the best thing that can happen to them. The sale commenced with one of the series of melanic *Papilio machaon* bred by Mr L. W. Newman and it was sold at the reasonable price of £13. Lot 2, A handsome rayed specimen of the same species, realized £19 as against £10 10/- paid for it at a sale in 1942. Lot 3, A smoky form of *Aporia crataegi*, brought £3 5/-. *Pieris napi*, L.—Lot 7, A ♀ albino, var. *citronæa*, £5 15/-. Lot 8, An underside aberration, one side albino, the other typical, £5. In 1939 this insect realized £15 10/-. Lot 11, An extreme form of the Caithness race, £4 10/-. *Euchloë cardamines*, L.—A male with yellow tips instead of orange, £7. Lot 15, A male entirely lacking orange pigment in forewings, £19. In 1942 this same insect realized £14. Lot 16, A buff tinted gynandromorph, £7. Lot 17, A male albino, £18. This, with several other similar ones, each brought £8 10/- in 1941-2. Lot 19, A gynandromorphous form, £12. *Pontia daplidice*, L.—Several pairs sold for 45/-, 47/-, 60/-, and 80/-. *Leptidea sinapis*, L.—Two ♂ forms of ab. *ganerew*, sold for the moderate price of £2 5/-. *Colias croceus*, Fourc.—Lot 24, A very unattractive purple-brown form, £7 10/-. In 1942 it realized £4 10/-. Lot 25, A form with forewings apparently *helice*, and hindwings typical *croceus*, £6 10/-. Lot 26, A mixed gynandromorphous form, £4 15/-. Lot 27, A wide bordered ♂ and a heavily marked ♀, £5. *Gonepteryx rhamni*, L.—A mixed gynandromorphous form, £13 10/-, a very high price for this kind of aberration. Lot 29, A male largely splashed all over with red, in no way symmetrically; an unsightly form of aberration which, in the writer's opinion, was greatly overpriced at £22. He has seen somewhat similar specimens, one of which was at one time in the Joicey collection. *Apatura iris*, L.—Lot 30, A ♂ ab. *iola*, £7, an average price for this form if the insect is really British. Lot 31, A ♀ with pale rays on the hindwings, £5 15/- — a not excessive price for this rarity. *Danaus plexippus*—Lot 32, £10 10/-, an unusually high price. *Limenitis camilla*, L.—Lots 33, 34, and 35,

Forms of *semi-nigrina* and *nigrina*, £3, £3 10/-, and £5 10/-. *Polygonia c-album*, L.—The white ground form taken by the late A. B. Farn, £42. The writer has seen this insect sold on two separate occasions for £20 and £21. The price now realized, £42, seems an excessive figure as the writer knows of two somewhat similar forms. Lot 37, A melanic form, £7 10/-, and one with yellow ground colour, £3 5/-. *Nymphalis polychloros*, L.—An aberration with the forewings clouded with black, £23. This same insect in 1942 sold for £8 10/-. *Aglaia urticae*, L.—One with white ground colour in bred condition, £6 10/-, a not excessive price as pure-white or cream forms are very rare. Lot 42, An extreme melanic form, £12 10/- (£8 in 1942). Lot 43, A form with enlarged blue lunules on hindwings, £8 10/-, a much higher price than usual for this form (ab. *cuneatiguttata*, Rayn.). *Nymphalis io*, L.—Lot 45, This extreme melanic insect has twice changed hands at the price of £30. On this occasion it realized £42. Lot 46, An ab. *belisaria*, £5 5/-. *Nymphalis antiopa*, L.—A form minus the blue marginal spotting, £11 10/-. This very rare form sold in 1941 for £7. Lots 49-51, Single specimens of type form, 22/-, £3, £3 3/-. *Vanessa huntera*—£5. This or a similar specimen sold in 1942 for 20/-. *Vanessa atalanta*, L.—A striking underside aberration with unusually broad red bands, £5 5/-, an average price for this form (ab. *klemensiewiczzi*, Schille, fig. Frohawk.). *Vanessa cardui*, L.—Lot 54, A form with whitish ground colour. This realized £18. It was sold in 1941 for £8. It is certainly a very rare insect. Lot 55, A very fine rayed form which sold for £14, not an excessive price for such an extreme aberration. *Argynnis paphia*, L.—Lot 56, A fine male ab. *melaina*, D'Aldin, £26, an unusually high price. Lot 57, An equally extreme female, for some reason not apparent, only realized £8 10/-, a very low price for such a fine insect. Lot 58, A fine ♀ ab. *confluens*, Spuler, £4 5/-. *Argynnis aglaia*, L.—Lot 59, A fine melanic ♂, £11. *Argynnis cydippe*, L.—Lot 60, A very fine ♀ with black forewings, £11. Lot 61, A male form of ab. *charlotta*, a very extreme example, £17. In 1942 this realized £16 10/-. Decidedly an outstanding aberration. Lot 62, ab. *cleodoxa*, £2 6/-. Lot 63, *Argynnis niobe*, L., 38/-. *Argynnis aglaia*, L.—Lot 64, A ♂ with black forewings and dark hindwings, £18. Lot 65, A ♀ ab. *confluens*, £12. *Argynnis lathonia*, L.—An aberration with suffused forewings, fig. in Barrett, £13 (£5 in 1942). Pairs sold for 23/-, 24/-, and 38/-. *Argynnis euphrosyne*, L.—Lot 70, A large white ♀, £5 15/- (£2 15/- in 1942). Lot 71, A yellow ♂ in bred condition, £2 8/-. Lot 72, A melanic ♀, 21/-. Lot 73, A silvery underside from the British collection of C. Oberthür, 34/-. *Argynnis selene*, L.—Lot 74, A white ♂ in good condition, 25/-. Lot 75, A perfect yellow male, £2 10/-. Lot 76, An extreme melanic ♂ in bred condition, £12. Lot 77, A melanic male small in size, £5 15/-. Lot 78, A silvery underside, small, £2. *Melitaea athalia*, Rott.—Lot 79, A ♂ with white markings, £6 10/-. Lot 80, A chocolate-coloured male, £3 10/-. Lot 81, A ♀ rayed on all wings, £3 7/6. Lot 82, A ♀ ab. *navarina*, £6 15/-. *Melitaea cinxia*, L.—Lots 83-85, Three forms, 13/-, 10/6, 13/-. *Melitaea aurinia*, L.—Lot 86, A good pair of the melanic race bred by J. Shepherd of Herne Bay, £4 5/-. Lot 87, A similar pair, £4 5/-. Lot 88, An albinistic form, 30/-. *Erebia aethiops*, Esp.—Lot 89, A ♀ with abnormally large spots on forewings, £3 12/6. *Pararge aegeria*, L.—Lot 90, An albino form, £7 10/-. Lot 91, Two

specimens of the form *aegerides*, £5. *Pararge megera*, L.—Lot 92, A dark suffused aberration, £3 10/-. Lot 93, A banded form, 36/-. *Satyrus galathea*, L.—Lot 94, The two famous all-black and all-white forms, £110. These were sold in 1942 for £91, and at the Harpur-Crewe sale some years ago for £63. *Maniola jurtina*, L.—Lot 97, An albino ♂ in bred condition, £6 10/-. Lot 98, A ♀ albino, £11. Lot 99, A golden ♂, £3 10/-. Lot 100, A similar ♀ in perfect condition, £5 15/-. *Aphantopus hyperantus*, L.—Lot 101, An ab. *lanceolata*, underside, £2 17/6. *Maniola tithonus*, L.—Lot 102, A fine golden ♂, £8 15/-. Lot 103, A striking ♀ with light golden forewings and typical hindwings, £5 5/-. *Coenonympha tullia*, Mull.—Lots 104-5, Two examples of ab. *lanceolata*, 10/- and £2 2/- each. Not exorbitant prices considering that this Delamere Forest form is extinct, and that such forms were always rare. *Heodes (Lycaena) phlaeas*, L.—Lot 108, A fine light golden form somewhat similar to ab. *schmidtii*, £22. This sold in 1942 for £5 5/-. Lot 109, An ab. *alba* in first-class condition, 36/-, a low price. Lot 110, ab. *bipunctata* in good condition, £4 15/-. This form is always in request. Lot 111, A melanic and two pale golden forms, £4. Lot 112, A fine ab. *extensa-conjuncta*, bred by E. Sabine and fig. in Frohawk, £9 (the price paid in 1942). *Chrysophanus (Lycaena) dispar*, Haw.—These sold each for sums of £6 15/-, £5, £4, £6 10/-, £4, £5, £6, and £6 15/-, according to condition. An aberration with rayed hindwings. Lot 116, £8, and Lot 117, with heavily marked forewings, £7. Lot 119, A pair of British *rutilus*, £3 10/-. A specimen of *H. (L.) chryseis*, £3 10/-. *Cyaniris acis*, Rott.—Sold in pairs from 30/- to 52/- each. *Polyommatus icarus*, Rott.—Lot 256, A perfect ab. *caeca*, 32/-, and an ab. *obsoleta*, 20/-.

(To be completed.)

GRASSHOPPER GOSSIP.

By MALCOLM BURR, D.Sc., F.R.E.S.

I. THE GENUS *PLATYCLEIS*-METRIOPTERA.

Orthopterists have for many years realized that the extensive genus *Platycleis* or *Metrioptera*, with seven dozen species, was a heterogeneous collection badly in need of revision. Even our British orthopterists, with only three species to consider, must have seen the marked difference between *grisea* on the one hand and *brachyptera* on the other. Now Dr Zeuner has given us the needed revision. He has split the genus into no less than eighteen genera, of which thirteen are new.

In 1838 Wesmael separated the short-winged species *brachyptera* from the long-winged *Decticus*, Serville. In 1852 Fieber established the genus *Platycleis* for a rather mixed lot, that he distinguished from *Decticus*. Under the influence of Brunner's *Prodromus*, Fieber's name prevailed for half-a-century for all the species. In 1908 Caudell revived the older, half-forgotten name *Metrioptera*. So our orthopterists grew accustomed to using either generic name for all the species.

In 1927 Ramme restored *Platycleis* for the grey, long-winged species related to *grisea*, leaving *Metrioptera* for all the others. Now Dr Zeuner, basing his work on no less than 83 species, has given us a new revision which, with characteristic modesty, he describes as provisional.

It was published in the *Transactions of the Royal Entomological Society of London*, Vol. 91, Part I, pp. 1-50, with 45 figures, on 27th June 1941, under the title "The Classification of the *Decticinae* hitherto included in *Platycleis*, Fieb., or *Metrioptera*, Wesm."

The introductory remarks are well worth the attention of all orthopterists, but the points that interest those who are concerned only with the British species are the following.

To begin with, he separates *Platycleis grisea* not into two races, as previously, but into two distinct species, to my satisfaction, for I have felt from my early collecting days that our British specimens, which I used to know so well along our coast between Folkestone and Dover, were distinguishable from many of the Continental forms.

Most will be surprised, though, to find that the true *grisea* of Fabricius is not on our list, nor will it ever be, for it is the East European form, extending from Italy and Eastern Germany away to the Altai. That is to say, it spread from its Mediterranean original home northwards east of the Alps. The west European form, which we have, is a distinct species, which Zeuner has separated, taking his type specimens from Tübingen, in south western Germany. It is *Platycleis occidentalis*, Zeuner. Adopting the trinomial nomenclature, he gives us *Platycleis occidentalis occidentalis*, Znr., which extends from southern England over France down to the Pyrenees and into central, western and south-western Germany. We have, however, a second subspecies, *Pl. occidentalis jerseyana*, Znr., from Jersey and Guernsey. I have no doubt that the specimens from Jersey in my collection, taken nearly half-a-century ago, now in the Hope Museum, belong to this race. There are four other subspecies known, from Spain and Morocco.

Our second British species, *brachyptera*, L., is the type species of *Metrioptera* as now restricted. It extends from England across the Old World to Kamchatka, and the only variant known is the macropterous form *marginata*, Thunb. This has not been recorded in Britain, so far as I can remember, but I have taken it in Normandy. The genus contains eleven other species.

Our third British species, *roeselii*, Hag., is the type of a new genus, *Roeseliana*. The species extends from England to Siberia, with the single variant in the macropterous form *diluta*, Charp., which has been taken in Essex. There are six other species of this genus. This species offers us another conundrum. Why is it confined, in Britain, to a narrow zone up the east coast from Essex to Lincoln?

Dr Zeuner has adopted an ingenious method of finding new names for many of his new genera, by simply adapting the name of the species which he has selected as the type, an ingenious "*memoria technica*." Thus we have not only *Roeseliana roeselii*, but also *Sphagniana sphagnorum*, *Decorana decorata* and even *Incertana incerta*.

It is hardly likely that any other species may be added to the British list, judging from the geographical distribution, except possibly *Bicolorana bicolor*, Phil., which ranges from France away into Asia, and, conceivably, *Metrioptera saussuriana*, Frey-Gessner, known from the Jura, Alps and Apennines.

Perhaps I may be pardoned the expression of a little gratification that, out of the 83 known species of the old genus *Platycleis* five were

discovered by myself, in such widely separated localities as Madeira, Northern Spain, Macedonia, Hercegovina, and the Transcaucasus.

To sum up, the correct nomenclature of our three British species is as follows:—

1. *Platycleis occidentalis occidentalis*, Znr.
- 1a. *Platycleis occidentalis jerseyana*, Znr.
2. *Metrioptera brachyptera brachyptera*, L.
- 2a. *Metrioptera brachyptera*, f. *marginata*, Thunb.
3. *Roeseliana roeselii*, Hagenb.
- 3a. *Roeseliana roeselii*, f. *diluta*, Charp.

SUBSTITUTE FOODPLANTS.

By P. B. M. ALLAN, M.A.

I have read Mr E. P. Wiltshire's article in the September issue of this Journal, and as it is concerned with a different matter from that which I initiated under this heading in the May 1942 issue, and continued at page 1 of volume lv, I should probably not have penned the following lines had not Mr Wiltshire attributed to me a statement which I did not make and an opinion which I did not express. I remarked, at page 3 of that volume, that in a particular case Mr Wiltshire's theory of "common associated evolution of plant and insect" would not seem to apply. Mr Wiltshire has construed (at page 84) this statement as "disproving" the whole of his theory. This is very generous of him, but at present I prefer to reserve my judgment upon his remarkable thesis until he has brought forward the body of evidence which I have no doubt he will presently adduce. It is perhaps a little unfortunate that he should—doubtless inadvertently—have adopted my title for his paper.

That the Lepidoptera evolved "side by side" with *flowering* plants (as I have stated elsewhere) is a postulate which accords with the evidence at present at our disposal; to assert that "plant and insect" have had "a common associated evolution" is quite another matter, and one wonders whether Mr Wiltshire has fully grasped the implications of his new philosophy. Plants form the basis of all life on this earth, because only plants are capable of converting inorganic matter into living matter. All animals therefore depend upon plants for their existence, either directly or indirectly. So if one class of animals, to wit insects, has had a "common associated evolution" with plants, Mr Wiltshire will have to inform us why other classes of animals have not enjoyed the same partnership. The advent of mammals is usually associated with the appearance of grasses; does Mr Wiltshire claim that lions and tigers have had a "common associated evolution" with grasses?

With regard to substitute foodplants as a phenomenon in host-selection and biological races, plainly the scientific aspect of this problem is one with which Mr Wiltshire is but little acquainted, since he claims as a coinage a word which is to be found in most of the modern textbooks dealing with the subject, as well as in the scientific periodicals devoted to the biological sciences, both English, American and of other

countries. No doubt he has been handicapped by being obliged to base his premises partly, as he informs us, on a popular handbook for young collectors, published in 1907 and since reprinted many times from stereo-type plates.

The literature of oligophagy and polyphagy as phenomena in host-selection and biological races is now a considerable one. Schroeder's observations, published so long ago as 1903, are still very much to the point, and Pictet's classical experiments with the larva of *Lasiocampa quercus*, L., were printed in 1911. Hering gave attention to this subject in his important work on the biology of the Lepidoptera in 1926, and the observations of Marchal (1908), Field (1910), Göschén (1913), Larson (1927), Harrison (1927), Thompson and Parker (1928), and Sladden (1934) should also be consulted. Craighead (1922) and Thorpe (1929-30-31) I have already quoted in a previous article. In 1936 Tate and Vincent discussed the literature of the subject, already large by that time, and an admirable brief résumé of the work done to date was made by Imms in 1937. The names of all the observers in several countries who have devoted their attentions to this subject are too numerous to mention here; their published papers should be studied carefully by anyone who enters upon this field.

The literature of insect palaeontology is also voluminous, so that one hardly knows how to deal succinctly with all the questions which Mr Wiltshire asks on page 84; but, baldly and briefly, the following facts may be of some assistance to him.

The earliest fossil Coleoptera known at present have been found in rocks of the Upper Permian. They consist of two families, the *Permo-philidae* and the *Permosynidae*. Of these the first-mentioned appear (*teste* Imms) to be "the direct ancestors of the existing *Hydrophilidae*, while the *Permosynidae* evidently lead on to genera existing in the Upper Triassic rocks." It was a discovery in rocks of this age at Belmont, N.S.W., that enabled the late R. J. Tillyard to describe, in 1924, the tegmen-like elytron for which he erected the order PROTOCOLEOPTERA. Remains of what appear to be even more generalized Coleopterid types occur in the same strata as these ancient beetles. In rocks of the Lower Permian occur the curious beetle-like Protelytroptera. Recent work on the Lower Permian beds of Kansas has been described (1933-5) by Dr F. M. Carpenter. As for the ages of the Permian and Trias, Mr C. E. P. Brooks assesses the age of their bases by duration ratio at 269 and 249 million years respectively. True Coleoptera are abundant in the Trias and include already specialized types.

Mr Wiltshire's question (at page 84), "What palaeontological evidence is there of this genus (i.e. *Cionus*) preceding the Tertiary Age by some two hundred millions years" would seem to indicate some misapprehension. Coleopterid types have been found in the Trias which certain observers have gone so far as to refer to existing Families; but I know of no evidence pointing to the existence of any modern genus in rocks of that age. In his recent (1943) paper, "Studies in the Systematics of Troides, Hubner," Zeuner writes (p. 174): "One will be fairly close to the mark, therefore, if one accepts a period of 500,000 to one million years as the time required for the evolution of a 'good' species . . . One important point, however, must not be overlooked. If half to one million years are required for the characters of a species

to become stabilized and irreversible, the species, once it has been so formed, may continue to survive virtually unaltered for a very long time thereafter. That this is the case is suggested, for instance, by certain *Hydrophilidae* . . . which have persisted with no apparent change in specific characters since the upper Miocene, a period of about 18 million years." But then, Hydrophilid beetles would, apparently, live in unchanged conditions, as regards environment, for untold periods; so this particular case for unchanged conditions during a period of 18 million years is altogether exceptional. *Prima facie*, such would not seem to apply to a highly specialized group such as *Cionus*, dependent upon terrestrial plants. Presumably even Common Associated Evolution has not stood still so far as the Coleoptera are concerned. That any genus of animals should have existed *in esse* for the tremendous period of 200 million years would be altogether opposed to our present conception of evolution.

But, as I have said, a large amount of work in several countries has been, and is being, done on both these subjects, and I fear Mr Wiltshire will find that much diligent reading will be required to enable him to catch up with it. Perhaps I may add that to propound a new theory of evolution without considerable acquaintance with modern scientific work on palaeontology and biological races seems to be a little precipitate.

COLLECTING NOTES.

AN UNUSUAL PIERID PAIRING.—On 18.iv.43, in my garden at Rodborough, I netted a pair of Pierids flying *in cop.*, the male being *P. rapae* and the female *P. napi*.—T. BAINBRIGGE FLETCHER, Rodborough, 24.x.43.

SOME DATES FOR GRASSHOPPERS.—The warm Spring of 1943 brought on Acrididae and I give dates when our local species were first noted this year at Rodborough (600 feet, on oölite), with some early and late dates of previous years:—*Stenobothrus lineatus*, ♂ ♀, 13.vi (14.vi.38, 27.x.37); *Omocestus viridulus*, ♂ 11.vi, ♀ 13.vi (11.vi.40, 9.x.37); *O. ventralis*, not seen in 1943, not at all common here (12.viii.39, 4.x.37); *Myrmeleotettix maculatus*, 28.v (13.vi.38, 2.xi.37); *Chortippus bicolor*, ♀ 28.vi (28.vi.40, 2.xi.37); *C. parallelus*, ♂ 12.vii (♂ 6.vii.38, ♀ 18.x.37); *Gomphocerus rufus*, ♂ ♀ 28.vii (30.vii.40, 11.xi.37, and one, still immature, on 26.xi.37).—T. BAINBRIGGE FLETCHER, Rodborough, 24.x.43.

NON-SPECIFIC ASSEMBLING SCENTS IN MACRO-LEPIDOPTERA.—With reference to Dr Kettlewell's interesting notes in the *Ent Rec.*, lv, 107, and liv, 62, it may be worth while to record that in 1940 Mr J. C. F. Fryer, who was breeding *Spilosoma lutea*, Hufn., from Wood Walton Fen, noticed that there were as many as twenty *Arctia caja* males in the insectary one morning, although there were no females of the latter in any of the cages, and they continued to appear as long as the *S. lutea* were emerging. The insectary is a wooden building about 18 feet by 9 feet 6 inches with wire netting sides standing in the laboratory garden. The same thing happened in 1941 and 1942. In case there should have been any wild females of *A. caja* anywhere near the insectary, the cage containing the *S. lutea* was in 1942 moved to an open greenhouse in

another part of the garden. Here the same occurrence was observed. In 1943 when *S. lutea* emerged rather earlier in the season and before *A. caja* was properly out, only a few *A. caja* males were attracted. It can therefore be assumed that females of *S. lutea* are attractive to males of *A. caja*.—H. M. EDELSTEN and J. C. F. FRYER, Plant Pathological Laboratory, Harpenden, 29/11/1943.

A BELATED RECORD.—At the end of July 1911, as the ship on which my mother was returning from America docked at Southampton a large Noctuid flew through the porthole into her cabin. This she captured and gave to my father. For some reason or other he never took steps to identify it or record it. Recently I sent the insect to Dr E. A. Cockayne, who kindly identified it as an American species, *Hadena arctica*, Boisduval. It is figured in Holland's *Moth Book*, plate xix, fig. 45, who says it is a common species ranging from Canada to New England and westward to Colorado. The interest of this record is that it proves that moths can be transported on ships from country to country in their perfect state. If this moth had flown straight from ship to shore and then had been captured, a record as a British specimen would then have been certain. Whether this should stand as a British record is a moot point. To my way of thinking it should certainly not. Nevertheless, I should be pleased to hear other peoples' views.—A. RUSSELL JAMES, Braemar, Morgan Crescent, Theydon Bois, Essex.

SUBSTITUTE FOOD-PLANTS.—Mr Wiltshire's *Vitis-Galium* Group of "Systematic diversity" is by no means confined to the *Sphingidae*. We have a specimen of *Desmia maculalis*, *Pyralidae*, *Pyraustinae* reared by the late Miss Murtfeldt on *Oenothera* (*Onagraceae*) though its usual food is *Vitis*. Also, if pairs of representative species are allowed, we have *Alypia octomaculata* (*Agaristidae*) on *Vitis* and *Ampelopsis*, the very close *A. langtonii* on *Epilobium*; also *Eudryas grata* (*Noctuidae*, *Acronyctinae*) on *Vitis*, but the very close *E. unio* on *Onagraceae* and *Ljthrum*. I referred to these cases in *Ent. News*, xxxvii, 310, 1926, and used the terms oligophagous and oligophagy in that connection.

A curious case parallel to *P. machaon*'s occasional reversion to *Rutaceae* is a single *P. asterias* I found once on *Cosmos* (*Compositae*): instead of reverting to the normal food of its ancestors it is looking forward to the food of *P. oregonia*.

Two further cases of very striking oligophagy are *Papilio thoas* and *Celerio lineata*, for the chosen foods have not only no botanical relation, but no biological similarity. *P. thoas* is commonly a Citrus feeder, living on high trees, but in British and Dutch Guiana is more commonly found on the practically herbaceous *Pepéromia*, within inches of the ground (*Piperaceae*). *C. lineata* shows the beginning of biological races, for specimens feeding on *Oenothera* (*Onagraceae*) commonly are green, and rest on the stems of the plant, while those on purslane (*Portulacaceae*) are black and bask on the ground in full sunlight. It will also take other foods but more rarely.

Callosamia promethea is perhaps not a fair example, for it will occasionally take a wide variety of trees and shrubs, though its three favourite foods are certainly botanically far enough apart: Sassafras and spicebush (*Lauraceae*), tulip tree (*Magnoliaceae*) and lilac (*Oleaceae*).—W. M. T. M. FORBES, Cornell University, Ithaca, N.Y.

THIRD APPEARANCE OF *DIRA* MEGERA.—The afternoon of 9th October was bright and warm and I was surprised to see two fresh-looking males of *Dira megera* playing together in my garden. I caught one and found it perfectly fresh, so presume that these males belonged to a third emergence, especially as the last individual of Brood II was noted as seen on 30th August, the first male having been seen as early as 22nd July.

I have been rather puzzled to know what genonym to use in referring to this species. One has been accustomed to place *megera* and *aegeria* (and other Holarctic species) in *Pararge*, described in 1817 (*Verz.*, p. 59) by Hübner solely for *aegeria*, which was its genotype from its inception (Hübner's other "species," his *meone*, ff. 179-180, is merely the more yellowish Southern form of *aegeria*). Recently, however, Dr Bryan P. Beirne has told us (*Entom.* lxxvi, 51: iii, 1943) that "*aegeria* has apparently no generic character in common with *megera*," for which he uses *Lasiommata*, Westwood. But, on looking up the original description (*British Butterflies*, p. 65: 1841) one finds that Westwood's name was a mere synonym of *Pararge*, Hb., 1817, as it included *aegeria* (already the genotype of *Pararge*) and *megera* ("*megaera*") and Westwood himself stated that "they [*aegeria* and *megera*] form Hübner's two groups, *Pararge* and *Dira*"; so that the result of Westwood's action was merely to provide *Pararge* with an unnecessary synonym.

Dira was also described in 1817 by Hübner (*Verz.*, pp. 59-60) for four species:—570, *roxelana*, Cram., 161 C-F; 571, "*megaera*," Linn., Hb. ff. 177-178; 572, *maera*, Linn., Hb. ff. 174, 175; and 573, *clytus*, Linn., Cram. 86 C-D. Of these four species, it is evident that Hübner derived his genonym, *Dira*, from "*megaera*," which was thereby indicated as the genotype of *Dira* from the latter's inception. The connection between the two names, *Dira* and *Megaera*, is plainly shown in Virgil's *Aeneid*, xii, 845-847: "Dicuntur geminae pestes cognomine Dirae, Quas et Tartaream Nox intempesta Megaeram Uno eodemque tulit partu, . . . ["Twain Plagues there are, the Dread Ones named of men, Whom with Megaera at one Hellish birth Night bare untimely, . . . *Billson's Transl.*]

Anyone who cavils at the statement that Hübner himself indicated *megera* as genotype of *Dira* may note that Westwood in 1841 made the same selection when he mentioned only "*megaera*" as forming Hübner's group *Dira*. *Amecera*, Butler, 1867, with genotype *megera*, is a synonym of *Dira*.

We have, therefore, (1) *Pararge*, Hb. 1817 (genotype *aegeria*, Linn.) = *Lasiommata*, Westwood 1841, and (2) *Dira*, Hb. 1817 (genotype *megera*, Linn.) = *Amecera*, Butler 1867, so far as our Lists are concerned.—T. BAINBRIGGE FLETCHER, Rodborough, 24/x/43.

LONGEVITY OF *EPIPSILIA* (RHYACIA) *SIMULANS*.—On 28.vi.43 I took a ♀ *Epipsilia simulans* and kept her for eggs, assuming that she had been fertilized as males were on the wing several days earlier, and on 17.vii I caught and put with her a second female for the same purpose. One of these (which one I cannot say) was dead on 11.viii; the other lived on, was moribund on 17.x and dead on 18.x, so had lived in captivity at least three, perhaps nearly four, months. Neither female oviposited, so perhaps fertilization takes place under natural conditions some weeks

after emergence. In previous years also I have kept *simulans* females but have never been able to obtain eggs. In the present case the longevity of the individual female was exceptional and seems noteworthy. My earliest and latest dates of captures have been 22.vi in 1939 and 1940 and 1.ix.34, the later specimens being worn and the last date unusual. In a fairly long series of specimens and after ten years' experience of the occurrence of *simulans* in my garden, I note that this moth is not uncommon from about Midsummer Day to mid-July in normal years and not seen thereafter, except in 1934, when worn examples occurred around the end of August.—T. BAINBRIGGE FLETCHER, Rodborough, 24.x.43.

HEODES PHLAEAS, L.: THIRD EMERGENCE.—I was very interested in Mr Siviter Smith's note on *H. phlaeas* in Gloucestershire, and as this question of a third emergence has a bearing on the subject of hibernation I have kept as detailed records as possible of the natural emergence of this and other species. I was able to collect data for *H. phlaeas* this year from Banstead, Surrey, and from the Cambridge district, where I was stationed for three months in the summer.

At Banstead the first brood appeared about 15th May and had ceased by 5th June. The numbers were below average and size was smallish. Then followed a blank period until 23rd July, when another brood of the duskier summer form appeared. These were well out when I returned to Cambridge at the end of July. Comparison with previous years and with observation at Cambridge indicated that this brood probably finished its span by the middle of August. Being on leave again in the middle of September, I found an entirely fresh emergence starting on 16th September and this was kept up until 9th October, on which date I took several beautiful specimens, quite fresh with clear copper forewings and much reduced spotting. It is interesting to record that the two weeks previous to 9th October had been unseasonably cold with a ground frost on the night of 7th-8th October—the critical stage of pupal existence for these particular specimens.

Near Cambridge there was a plentiful emergence during the first two weeks of August with a break until the middle of September. From this time until I left on 5th October emergence was occurring in quite fair numbers. The form was the colder weather type with no dusky shading. These results were paralleled in 1941 (in the autumn of 1942 I was unable to do any observing) when I found a third emergence of *H. phlaeas* at Banstead and Wimbledon early in October. From these results and from still earlier data I feel confident that, as far as the south-eastern part of England is concerned, there is a definite third emergence of this species in late September and October. Rearing from August ova supports this view, as broods tend to divide up into hibernating larvae and non-hibernators which can be reared through without a break.—F. V. L. JARVIS, 21 Shirley Avenue, Sutton, Surrey.

ARGYNNIS PAPHIA, LINN. (AN ENQUIRY).—As is well known, this species in certain seasons in the New Forest varies in considerable numbers. In practically every instance these seasons occur only at long intervals, and then continue for two successive seasons, such for example as the years 1918 and 1919 and 1941 and 1942. Apart from these dates, there have been no seasons during which more than an odd specimen of an aberration has been seen or taken. Certainly in 1917 and 1940 very

few aberrations were reported. The forms produced are minor and extreme forms of ab. *melaina* in which the wings are clouded more or less heavily with black, or ab. *confluens*, in which the normal spots are joined together, forming bars or stripes. Now, taking into consideration the principles of the Mendelian Law, one would expect this aberration to continue into the third year, whereas they entirely disappear and may not again appear for as long an interval as 20 years or more, as evidenced by the dates I have given in particular. What may be the explanation of this? Is it that heredity has no part in the production of the aberrations and that they are due to climatic or other influences? It is interesting to note that when the aberrations occur in the New Forest they are also reported from other and far distant localities where, so far as I can learn, they are normally never seen. This seems to show that the cause is one that affects the whole country and due to other influences than heredity. In addition to the many examples captured a number were released as being too worn for the cabinet and it is reasonable to assume that in such a large area many evaded notice. Some learned person may say that as all the vars. were captured they had no chance to reproduce aberrations. An absurd argument, of course, as many more aberrations than were caught must have been flying in the enclosures. I have bred from extreme forms of ab. *melaina*, the first generation of which has produced only normal forms together with var. *valezina*, but unfortunately I have not been able to proceed further owing to the insects refusing to pair in captivity. Some comments from Dr Cockayne, whose knowledge of the technicalities of the Mendelian Law is so comprehensive, would be interesting and valuable.—S. G. CASTLE RUSSELL, "Springetts," Highcliffe, November 1943.

[Mr Castle Russell raises an interesting question in his note on *Argynnis paphia*. It has been suggested that the aberrations *confluens*, *melaina*, and various intermediate forms have a genetic basis, but that in addition an environmental factor is necessary to make them apparent. The most probable factor is temperature. Thus abnormal cold or heat at some critical period of development would produce aberrational forms in insects of the *confluens* or *melaina* genotype, but would not affect those genotypically normal. Such a state of affairs has been proved to occur in the case of a dark form of *Panaxia dominula*. If the aberrations were purely genetic they should occur in approximately the same percentages every year in a given locality, if the population were a sufficiently large one, but Mr Castle Russell has shown that this is not so. It is unlikely that an environmental factor such as temperature is the sole cause. A brood of *A. paphia*, which produced a number of beautiful aberrations, was not subjected by Mr L. W. Newman, the breeder, to extreme heat or cold, and the years in which aberrations of *paphia* and *Limenitis sibilla* ab. *nigrina* and ab. *seminigrina* occur in nature are not exceptionally hot or cold. Final proof can only be obtained by breeding experiments such as Dr Kettlewell carried out with *P. dominula*.—E. A. COCKAYNE, Merstone, Tring.]

CURRENT NOTES.

THE Second Sale of the Beckwith Whitehouse Collection will take place at the Glendining Rooms, 7 Argyle Street, on Tuesday, 25th January, at 12 o'clock.

IN addition to the decease of Sir Edward Poulton, which was reported in our pages last month, we have to report the passing of three more of the generous band of Fellows of the Royal Entomological Society who some 20 years ago worked so strenuously and so successfully to raise the financial position and status of the Society. We hope to give short notices of H. Willoughby-Ellis, H. Eltringham, and W. G. Sheldon. We regret to hear the decease of L. B. Prout has just been announced.

PART VI of the "Microlepidoptera of Gloucestershire," extracted from the *Proc. Cotteswold Nat. Field Club*, by. T. Bainbrigge-Fletcher and C. G. Clutterbuck, has reached us. It is rather unusual that our local bodies of Naturalists are able to publish details of the occurrence of Microlepidoptera, and we congratulate this Society on the records they are advancing. It is the custom to record in counties but whether such assemblies are really scientific would in many cases be difficult to advocate. It seems better to take an area based on some physical division such as a river basin, a chalk area, a plateau, even a sea dominant area, or a mountain valley, rather than a politically limited locality, and thus associating soil and plants and climate in an ecological whole.

IN the Entomological News (Philadelphia) for October there is a very interesting account of the life career of a batch of larvae from an egg-mass of a Sphingid moth. A female of *Ceratonia catalpae* laid an egg mass of 369 ova. About 350 larvae ultimately began their life on the underside of one catalpa leaf, dispersing over the tree in about three days. A close record of what happened between hatching (August 21) and pupation (October 10) was kept. Eventually about 15 pupae resulted which next year will prove how many of these are free from ichneumon attack. The brood suffered loss from Ants, Bad Storms, Attacks by a Hemipteron species and by Ichneumons (more than a single species and at different stages). The next morning after hatching about 100 larvae were missing, the worst single **populational disaster**. The cause of this was not definitely ascertained but the suspicion was on the Ants that had threatened attack on the first day. Thus the percentage remaining out of the 369 ova was 4.1% so far.

COMPARATIVELY few English Entomologists seem to see the *Transactions of the Zoological Society of London*, so it seems as well to call attention to a particularly interesting paper recently published therein (Vol. xxv, part 3, pp. 107-184, "July" 1943 [sent out on 20.ix.43]) by Dr F. E. Zeuner, "Studies in the Systematics of *Troides* . . . and its Allies; Distribution and Phylogeny in relation to the Geological History of the Australasian Archipelago." It is not possible to summarize this long paper in a short paragraph, but, besides Dr Zeuner's work on the *Troides* (*Ornithoptera*) group of Butterflies, it contains a great deal of very interesting information on such subjects as the Time Factor in Evolution, Climatic Changes and Fluctuations of the Sea-level, and the Theory of Continental Drift, as applicable to the Australasian Archipelago—and also requiring consideration in any study of other Insect Groups from this area.—T. BAINBRIGGE FLETCHER, Rodborough.

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Avenue, Hove 4, Sussex.

Books Wanted.—"Draug-Seitz Suppt., Vol. III (Noctuae)," English preferred.—
A. J. Wightman, "Aurago," Pulborough, Sussex.

Book wanted.—Frohawk, F. W., "Varieties of British Butterflies" (1938).—A. F. L.
Bacon, The Malt House, Burghclere, Newbury.

Desiderata.—Wanted a pair of *Argyrophorus argenteus*, the silver butterfly of
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Ent. Record and Journ. of Variation, 1944.

LARVAL CASES OF EUPISTA (COLEOPHORA) CONYZAE, ZELL., ON
INULA DYSENTERICA.

EUIPISTA (COLEOPHORA) CONYZAE, ZELL., IN DORSET.

By S. C. BROWN.

(Plate I.)

13,820

Museum of Comparative Zoology
MAR 13 1940
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The late Prof. Waters, in discussing this species in the *Ent. Monthly Mag.*, 63, 1927, p. 184, writes: I had always regarded this as essentially a south-coast species; in Dorset and the Isle of Wight, for instance, it is locally common in sheltered spots near the sea, but the only British inland locality recorded seems to be the Box Hill district of Surrey. It is therefore an unexpected pleasure to be able to add this species to the Oxfordshire list. Dale, *Lepidoptera of Dorset*, 1886, gives the Swanage coast.

It is not, however, completely confined to the coast in Dorset. I came across this species in 1939 at Hodd Hill, near Blandford, where I found the cases in plenty on *Inula conyza*. In 1942 I revisited this locality, but failed to find a single case.

As this species was not figured by Stainton, I venture to submit a drawing of the larval cases on *I. dysenterica*.—Bournemouth.

BOARMIA (TEPHROSIA) CONSONARIA, AB. WAIENSIS, IN THE FOREST OF DEAN.

By G. B. MANLEY.

Having heard that *T. consonaria* was locally common in the Forest of Dean and in certain districts the ab. *waiensis* also occurred I paid a visit to the Forest in early May 1940. I was joined by the late Sir Beckwith Whitehouse. We found several of the moths, both type and *waiensis*, but they were rather worn and had evidently been out some time. We got a small batch of ova and from these we bred a number of the moths, which hatched out in the April following. They were all type, with no sign of the *waiensis* form. The pairings had evidently taken place before we found the insects.

The females of this brood were very distinctly marked with the "Square Spot" on the forewings; otherwise there was very little difference between them and others from southern districts.

After this disappointment we went again to the Forest and our efforts were rewarded. We took about a dozen each, about half of them ab. *waiensis*. I was fortunate in finding on the same trunk a male and female of the *waiensis* form, which had evidently paired overnight.

From these I obtained ova which duly hatched and the larvae had all pupated by the middle of July. The following April the moths appeared, 27 *waiensis* and 4 type. Sir Beckwith got nearly the same result from his brood, which was larger than mine.

Having got two pairings (this takes place in the early hours, after midnight) of the *waiensis*, I bred 47 moths in 1943, all true *waiensis*. They did not vary much, the ground colour of the forewings being dark brown, in some almost black, especially the females. The patch of grey on the upper wings was more pronounced in some. The lower wings were deeply banded with the dark colour, the ground colour being grey.

The summary of results is as follows:—

		<i>waiensis.</i>	<i>Typical.</i>
1941	From wild <i>waiensis</i> ♀	Nil	32
1942	From wild <i>waiensis</i> ♀	27	4
1943	From 1942 <i>waiensis</i> ♂ and ♀	47	Nil

I have no record of Sir Beckwith's second brood, 1943.

The larvae were fed on birch. They hatched from the ova in about a fortnight, fed up rapidly, and all had pupated by the middle of July. They are night feeders, resting by day fully extended along the birch stems.

The *waiensis* form is quite a striking-looking insect, especially when one sees it on the trunks. Owing to the almost perfect camouflage and the shade of the woodlands it is somewhat difficult to find. The grey patch on the forewings seems to catch the eye first. They appear to prefer the spruce trunks as a resting place.

Unfortunately, all the trees in the locality we visited have been felled, including the fine avenue of large spruce. However, I know that Sir Beckwith turned up a number of *waiensis* in another area, where the type was already in evidence.—72 Tenbury Road, King's Heath, Birmingham.

TWO VISITS TO THE HAMMAR LAKE.

(24th May and 14th November 1943.)

WITH A DISCUSSION OF S. IRAQIAN MARSH FAUNA.

By E. P. WILTSHIRE, F.R.E.S.

(Cartographers apply the name Hammar Lake to the whole; local usage to the part; the author here follows the former.)

On 24th May a North wind was blowing and the Euphrates flood was at its peak. The lake therefore was at its maximum extent along its entire southern shore; the water now lapped the edge of the rising ground to the south of the village which we were visiting, a few miles to the north of the Basra-Bagdad line running west from Ma'qil, Basra. The village name is given on no map; it contains not a single permanent house; there is therefore no need to give its name here. Inhabited by Marsh Arabs, its houses are built of reed and rush; they are moved from their low-water position southwards on to higher ground when the floods come. The flood season lasts from April to July.

The high ground against which the flood waters now lapped was a waterless sand-and-gravel desert, a botanical account of which has recently been published*; the animals and insects of this desert are not discussed here, though some attention was, of course, paid to them on each of the two visits here described. The ground between the high-water limit and the low-water limit is alluvial mud.

The bright, rather hot afternoon was now inclining to evening; that is, the temperature had been well over 90° F. in the shade, nothing out of the way for this part of the world, where mid-day shade-temperatures

*M. Zohary. "The Flora of the Desert to the South and West of Basra, Mesopotamia" (*Proc. Linn. Soc. London*, Part 1, August 1941).

of over 110° F. usually continue for several months every summer, with peaks of 120° F. or a few degrees more.

Leaving the car at the water's edge, we embarked and beheld the village before us as though floating in the water. Actually it now stood on a muddy ridge about half-a-mile north of the car; it consisted of a few semi-circular roofed structures around which huddled a few animals, humans and boats. The men guiding our craft were well-built, well-fed, and seemed none the unhealthier for their humid habitat. It is a curious fact that malaria is not prevalent in these marsh districts, though it ruins the health of the population of the Shatt-el-Arab date-zone. Not a tree broke the sky-line. Soon a new element of vegetation appeared on our short horizon, behind the village—a low dark green line. Crossing the ridge on which the village stood, and which was a bare inch or two above water at its highest point, by a shallow channel cut in the mud, we approached the green line, which proved, on inspection, to consist entirely of bulrush (*Typha*). As dusk fell, we could just distinguish a pelican flying low over the water away from our course. One or two solitary reed-stems (*Phragmites*) pierced the waters around us, but in this vicinity, at least, they were of no ecological significance; the same could be said of a solitary tamarisk, planted by our host to mark the low-water site of the village and the beginning of a channel piercing the rush-bed; this tree also stood out of the waters.

We pushed into the bulrush-bed by the channel, and stopped at a slight widening of the channel. No other vegetable species was to be seen above the water except the *Typha*. The lamp was lit, the sheet spread, and soon many gnats came to it. Only three species of moth were seen: *Nymphula affinalis*, Guen., came in swarms; a single micro (BM.32) came with them; and a female *Sideridis zeae*, Dup., was netted among the bulrushes close to the boat. I saw no traces of any boring insect in the bulrushes.

"These are all bulrush (*Bardi*)," I said to my host; "Are there no reeds (*Qasab*)?"

"Not here. There are some beds of it nearly ten miles away, higher up the lake."

Half-an-hour after lighting up we returned across the now darkened waters towards the village. Swarms of *affinalis* still came to the light, though we had left the rushes far behind.

On the way back we stopped the car in the desert and shone the head-lights; *affinalis* again appeared in some numbers, though a greater contrast than that of its desert habitat to its marsh habitat cannot be imagined. Twelve other species of moth also came to light in the desert, some in numbers. The dry desert was evidently richer in species than the marsh, though the climatic optimum for desert insects had already passed, and we were approaching the summer diapause, whereby the desert's midsummer becomes almost as lifeless as a winter.

The comparative poverty in Lepidoptera of the marsh (where only one species was numerous, and only three seen at all) was the more remarkable because at this date I had expected a maximum of marsh insect-life. I based this expectation on my previous experience of Middle East marsh biotopes and marsh Lepidoptera, which can be summed up in the following table:

Latitude, Height (feet), and Locality.	Character of Marsh.	Name and Season† of Borer-Moth.
36-37° N. c. 3000. Kur- distan.	Small streams; <i>Typha</i> usually alone; <i>Phrag-</i> <i>mites</i> in <i>Rubus</i> thic- kets.	<i>A. geminipuncta</i> , vi. <i>P. typhae</i> , vi-vii.
33-34° N. c. 3000. Coele- Syria.	Small marsh fed by large spring; <i>Phragmites</i> , <i>Typha</i> , <i>Iris pseudo-</i> <i>corus</i> .	<i>A. geminipuncta</i> , vi-vii. <i>P. typhae</i> , vi-vii. <i>A. sparganii</i> , vi-vii.
31-32° N. 200. Ahwaz.	Ballast - pits containing water, surrounded by alluvial desert <i>Phrag-</i> <i>mites</i> , <i>Tamarix</i> . (In irrigated gardens <i>Arundo donax</i> is grown as wind-break, mixed with some <i>Phragmites</i> .)	<i>P. castaneae</i> , iv.
29-30° N. c. 5500. Shiraz.	Mountain - stream with succession of springs; <i>Phragmites</i> , <i>Typha</i> .	<i>P. typhae</i> , vi-vii. <i>A. algae</i> , vi. <i>A. sohn-retheli</i> , vi.
28-29° N. (?) 8000. Kuh Taftan.	Not seen by me.	<i>P. typhae</i> , vi.

(The record of the last of the above localities was by Brandt, *in litt.*, to me. The full names of the above borer-moths are: *Phragmitiphila typhae*, Thnbg.; *Arenostola sohn-retheli*, Pungl.; *Archana sparganii*, Esp.; *Archana geminipuncta*, Haw. (ssp. *wiltshirei*, B.-Salz, in Syria, and ssp. (?) *orientalis*, Wagn., in Kurdistan); *Archana algae*, Esp. (= *cannae*); *Phragmatoecia castaneae*, Hubn.).

It was therefore probable that the reed- or rush-boring *Agrotidae*, if present at all, would be on the wing in May-June in the Hammar Lake marshes (Lat. 30-31° N. Height above sea, less than 50 feet). I had previously failed to detect traces of *typhae* in the bulrushes of the tertiary creeks or ditches of the Basra date-gardens; now it looked as if this moth was absent from South Iraq. A later visit was to confirm this view. It was surprising that in this marsh biotope the only abundant moth was a species not peculiar to marshland, but found in abundance, and flying in repeated broods, all over the Iraqi plain, in every biotope.

(To be concluded.)

†A comparison of these times with that of the same species in England and a discussion thereof has already been published, viz., in "The Phenological Classification of Palearctic Lepidoptera," *Ent. Rec.*, 15.x.1941, and the two previous phenological articles mentioned therein.

A NEW FOOD PLANT FOR *ACALLA* (PERONEA) *HASTIANA*, L.—Normally this moth feeds on *Salix aurita* in the Hebrides, although it is far from uncommon on *S. atrocinerea* and also *S. repens*. Two years ago we reported it from *S. arbuscula* on Rhum. Now we can report it from *S. myrsinites* on the mountain known either as Minshal or the Black Hill, Rhum. This willow is now recorded for the first time from any Hebridean island.
—J. W. HESLOP HARRISON, King's College, Newcastle-upon-Tyne.

THE WHITEHOUSE SALE OF BRITISH LEPIDOPTERA.

(Continued from p. 3.)

HETEROCERA.

This portion of the Collection was also very rich in outstanding forms and examples of rare and immigrant species, and the following Lots are selected for reference:—

Lots comprising the various species and forms of *Sphingidae* with hybrids and aberrations fetched from 10/- to £2 each. Lot 156, a fine example of *nerii*, realized £4 15/-, and two examples of *gallii*, £2 2/- and £3 7/6 each. A *euphorbiae*, £4 10/-. *Leucodonta bicoloria*, Lot 170, the original ♀ from Burnt Wood, £4, and the original ♂ from the same locality, £4 10/-. Lot 172, a bred ♀ from Burnt Wood, £4. Lot 170, *Notodonta tritophus* ♂, £6 15/-. Lot 176, *Laelia coenosa*, pairs, 13/- to 19/-. *Epicnaptera ilicifolia*, 11/- to 32/- each. Lot 194, *Endromis versicolora*, a series of 6 forms, including *lapponica* with an original drawing by F. W. Frohawk. Bidding did not reach the reserve price of £15. *S. pavonia*, Lot 196, a gynandromorphous form not completely halved as regards sex, £6 16/-. Lot 197, *Drepana sicula (harpagula)*, pairs, 20/- to 34/- each. *Arctia caia*, a pair of ab. *petri-burgensis* (red form), £2 17/6. Lot 202, a pair of the yellow form of this race, £5 10/-. Lot 203, a melanic ♂ with brown forewings and sooty-black hindwings, £14. Lot 204, a ♀, forewings nearly all brown and hindwings blotched with black on orange, £5. Lot 205, a form with forewings almost pure white with pale orange hindwings, £18. Lot 206, a ♀ with excess of white on forewings and enlarged markings on hindwings, £5 5/-. Lot 207, a similar specimen, £2 12/6. Lot 208, a similar ♂, £4 5/-. Lot 209, a ♀ with curiously coloured hindwings all suffused with black, £4 5/-. Lot 210, *Arctia hebe*, Portslade Quay, 21/-. *Callimorpha hera (quadipunctaria)*, Lot 211, an aberration of the yellow form with dark forewings, £6 15/-. *Arctia villica*, Lot 262, a ♀ with excess of white on forewings, £2 2/-. *Panaxia dominula*, ab. *bimacula*, a pair, 26/-. A ♀ with deep orange spots on forewings and a ♂ with pink hindwings, £2 15/-. *C. jacobaeae*, a rare melanic ♂, £7. A yellow form, ab. *flava*, £8 10/-. *D. pulchella*, fine specimens, 10/- to 35/- each. Lot 204, *N. subrosea*, three specimens, £5 5/-, £4 10/-, £3. *D. compta*, Folkstone, 30/-. *C. exulis*, two ♂s, £2; two similar, 30/-. *C. assimilis*, a pair, £2 6/-, and another pair £5 5/-. Lot 233, *M. peregrina*, £2 2/-. Lot 237, *Sidermia zollikoferi*, Lydd, £20; a similar specimen, ab. *internigrata*, £13. Lot 232, *V. oleagina* (no date), 5/-. Lots 235-6, two *Oria musculosa*, each 6/-. Lots 240-242, each example, 19/-, 24/-, 26/-. Lot 239, *L. unipuncta*, Devon, £5 15/-. *Zinckenii (lambda)*, Darent Wood, £7 10/-; another specimen, 65/-. Lots 246-249, *Conformis (furcifera)*, in pairs, £2 15/-, £3, 35/-. Lots 250-254, *fraxini*, in bred pairs, £2 12/-, £2 17/6, £3 3/-, £2 15/-, £3.

BOOKS.

Buckler's *Larvae*, 9 vols., £9. Barrett's *Lepidoptera of the British Isles*, large edition, with plates, £13. Stainton's *Tineina*, 13 vols., £4 10/-. Wilson's *Larvae British Lepidoptera*, £2 5/-. Bright and Leeds Monograph on *L. coridon*, £2. Frohawk's *British Butterflies*, large edition, £4 15/-. Humphrys and Westwood, £2 12/6. *African Mimetic*

Butterflies, Eltringham, £2 6/-. Lang's *Butterflies of Europe*, 2 vols., £2. *Rhopalocera Malayana*, Distant, £2 5/-.

CABINET.

A 40-drawer mahogany cabinet by Brady, £45; original cost, £20.

The approximate sum realized by the sale amounted to £1350; a highly satisfactory result. The prices obtained generally for the insects, especially those much figured in entomological works and of some historical interest were much higher than when sold on previous occasions, although there were instances in which they were below them. It would seem that insects, together with practically everything else, have risen very considerably in value, due no doubt in some degree to the difficulties of purchasing "couponed" goods. Very much the same thing happened after the Great War when cabinets and insects realized untold prices at auction. In due time, however, prices reverted to the normal and doubtless the same thing will occur on this occasion.—S. G. C. RUSSELL, Springetts, Highcliffe, Hants.

ORTHOPTERA OBSERVED IN 1942.

By J. A. WHELLAN.

The following species were observed during the summer in Westmorland and West Lancashire and from 6th to 16th August in North Wales. Over all this area it can be said that *Omocestus viridulus*, L., and *Chorthippus bicolor*, Charp., are abundant species. *Ch. parallelus*, Zett., is also probably rather generally common, while *Myrmeleotettix maculatus*, Thunb., is probably more local. In general, however, the area seems to be poor in variety of species. In several cases, in the following list marked *, the species in question is not recorded in Dr M. Burr's book, *British Grasshoppers and their Allies*, for the county here mentioned.

Blatta orientalis, L. Plentiful in greenhouses at Blackpool, Lancs., and often seen in streets there.

Periplaneta australasiae, Fab. Five seen, all mature, in greenhouses at Stanley Park, Blackpool, Lancs., 27th July 1942.

Omocestus viridulus, L. Abundant, Silverdale and Arnside district, Lancs. and Westmorland; usually bright green here. Plentiful about Chipping, Lancs.; more olivaceous here. Warton Crag, Lancs., 29/8/42; the only orthopterous insect seen here. Near Beddgelert, Caernarvonshire. Pont-y-Glyn Diffwys, *Denbighshire.

Myrmeleotettix maculatus, Thunb. Arnside and Meathop, Westmorland. Hillsides about Glyndyfrdwy, *Merionethshire and Denbighshire. One specimen brightly mottled red and green among heather. More usually of a brownish coloration.

Chorthippus bicolor, Charp. Martin Mere, St Annes, Rufford, Shard Bridge, Lancs.; Meathop, *Westmorland; Pont-y-Glyn Diffwys, *Denbighshire; Glyndyfrdwy, Denbighshire and *Merionethshire, Beddgelert, Caernarvonshire.

Ch. parallelus, Zett. Beddgelert, etc., Caernarvonshire; Glyndyfrdwy, Merionethshire; Little Langdale, *Westmorland.

Gryllulus domesticus, L. Abundant in hothouses at Stanley Park, Blackpool, and in bakehouses at Colne, Lancs.

A NOTE ON THE NOMENCLATURE OF SOME MICROGASTERINE BRACONIDAE (HYM.).

WITH REFERENCE TO THE WORKS OF HALIDAY AND NEES
VON ESENBECK PUBLISHED IN 1834.

By W. D. HINCKS, M.P.S., F.R.E.S.

In the year 1834 two* important works on the *Braconidae* appeared. Haliday published two parts of his series of papers entitled "Essay on the Classification of Parasitic Hymenoptera, etc.," in the second volume of the *Entomological Magazine*. This volume bears the date 1835 on its title-page, but only the fifth and final part was published in January of that year, the other parts being dated from January 1834 (No. vi) to October 1834 (No. ix). In this year Nees von Esenbeck's *Hymenopterorum Ichneumonibus affinium monographiae, genera Europaea et species illustratae* was published in Stuttgart and Tübingen, in two volumes. Many older authors regarded Haliday's papers as published in 1835 and thus priority has usually been given to Nees, where both authors described the same species. I believe, however, that there are data which may cause this decision to be reversed.

On the fly-leaf of the copy of Nees belonging to the Royal Entomological Society of London there are the following pencil notes:

"Listed in works published 'depuis 1er Octobre 1834.'

See *Ann. Soc. ent. Fr. (Bull. ent.)*, 3: xciv.

Received. Vol. 1. By Soc. ent. France, vol. 1, 1834, between 6.viii.34 & 3.ix.34. See *Ann. Soc. ent. Fr. (Bull. ent.)*, 3: xli.

Vol. 2. Between 17.xii.34 & 7.i.1835. See *Ann. Soc. ent. Fr. (Bull. ent.)*, 4: 'ii.'

I am not in a position to check the above references at the moment but the evidence which they give seems to indicate that volume 1 of Nees' Monograph was published sometime after 1st August 1834 and his second volume towards the end of the year, perhaps in December.

Haliday's work in the 1834 parts of the *Entomological Magazine* consists of a paper in the January number (No. vi: 93-106) devoted to the group we now call the *Aphidiidae* and a second in the July issue (No. viii: 225-259) on the *Microgasterinae*. The first of these almost certainly predates Nees' publication and Haliday's names should have priority. This does not at present render necessary any alterations since the identity of many of Nees' Aphidiids are very doubtful and the names of Haliday have therefore long been in use. The second paper, published in July, probably predates the first volume of the Monograph

*Actually a third work published this year complicates the synonymy of a few species of the *Microgasterinae*. This is Bouché's *Naturgeschichte der Insecten besonders in Hinsicht ihrer ersten Zustände als Larven und Puppen*, Berlin, 1834, pp. 5+216, 10 pls. I have not seen this work, of which the above is said to be only the first part. Since the species of *Microgasterinae* and others, described are, however, quoted by Nees in his second volume, it is probable that the *Naturgeschichte* pre-dates both volumes of Nees' Monograph. I have no data for forming an opinion of its chronological relation to Haliday's *Essay*. Where Bouché's species have been thought to be identified with certainty they appear to have been given priority by Marshall, Dalla Torre, and other authors.

of Nees and is almost certainly prior to the second volume. However, it will perhaps be better to await further evidence before making any alterations for three reasons: (1) because several are well known, widely used names of economically important species, (2) because the late D. S. Wilkinson's excellent work on *Apanteles*, etc., has shown that Marshall's synonymy is not always to be relied upon and it is therefore necessary to re-examine the species in question before adopting any changes, and (3) because work is now progressing to complete the monograph started by Wilkinson wherein presumably these questions of nomenclature will be fully dealt with.

It may be useful, however, to list the instances where changes may be necessary. It should be noted that only in the case of the well-known *Apanteles congestus*, Nees, did the Neesian name first appear in the second and later volume of the Monograph. On the evidence given this name would certainly require to be replaced by *A. intricatus*, Haliday. All the species described by both authors were placed under the generic name *Microgaster*. In the list which follows the current names are placed on the right:

Apanteles intricatus, Hal., and *congestus*, Nees.

Apanteles praetextatus, Hal., and *analis*, Nees.

Apanteles equestris, Hal., and *falcatus*, Nees.

**Apanteles annularis*, Hal., *hilaris*, Hal., and *emarginatus*, Nees.

Apanteles drenarius, Hal., and *obscurus*, Nees.

Apanteles lacteipennis, Hal., and *albipennis*, Nees nec Hal.

Apanteles candidatus, Hal., and *impurus*, Nees.

Apanteles albipennis, Hal., and *halidaii*, Marshall.

Apanteles umbellatarum, Hal., and *circumscriptus*, Nees.

Microplitis (new name required) and *spinolae*, Nees nec Hal.

Microgaster consularis, Hal., and *connexus*, Nees.

Microgaster infumatus, Hal., and *rugulosus*, Nees.

Microgaster annulipes, Hal., and *subcompletus*, Nees.

Microgaster spinolae, Hal., and *crassicornis*, Ruthe.

It should be noted that Wilkinson (1941, *Proc. R. Ent. Soc. Lond.* (B), 10: 71) has already published a paper on *Apanteles albipennis*, Hal., but was unaware of the data here recorded and he therefore used the name *A. halidaii*, Marshall, 1885.

**Apanteles annularis*, Hal., is listed by Dalla Torre (1898, *Cat. Hym.*, iv) as distinct from *emarginatus*, Nees.

COLLECTING NOTES.

MONTGOMERYSHIRE NOTES.—The winter of 1942-3 was an unusually mild one—the newspapers asserted that it was the mildest for thirty years—and the prophecy recorded in my diary on 1st April, that "the coming months will probably be the worst, entomologically, for thirty years" unhappily proved to be true. It was a most disheartening season, in mid-Wales, and many species which are usually plentiful were almost entirely absent. An exception was the Grayling butterfly, which occurred in such abundance as I have never before known in my many years' experience of this county.

On 21st January I found the first moth of the year, *Erannis leucophaearia*, at rest on an oak. Nothing else occurred until 11th February, when *P. pedaria* put in an appearance. The 18th was a wonderful springlike day, the sun shining in a cloudless sky from sunrise to sunset, with a gentle N.W. breeze. Up in the hills I found a young larva of *Arctia caja* hurrying across a road, and next day *A. aescularia* was seen.

On 1st March I dug at old oaks and found cocoons of *B. prasinana*, two *D. trimacula* and, in a chink of bark, a quite fresh ♀ *C. vaccinii*. On the 5th *V. urticae* was on the wing. 10th March disclosed *D. jagella* on the trunks of beech and oak, and I found another *D. trimacula*. The first *Brephos parthenias* flew about birches on the 17th, *Orthosia (Taeniocampa) incerta* being seen the previous day. I was in London during the remainder of the month, and when I returned found that my wife had taken *B. strataria*, *O. munda*, *O. incerta*, *S. libatrix*, and *E. transversa*.

3rd April was fine and sunny, with many *V. io*, a few *V. urticae*, *P. c-album*, and a male *E. cardamines* on the wing, as also *B. parthenias*; but this moth's scanty appearances were in striking contrast with its profusion last year. I searched industriously for imagines of *A. flavicornis* without success; but that it was present was shown by the discovery, later in the year, of a few larvae. *P. ridens* occurred on the 12th; but at sugar that evening not a moth appeared. Next day *G. bidentata* was seen. From the 14th to the 26th *E. crepuscularia* was not uncommon on larch and oak trunks. In the house *Orneodes hexadactyla* began to appear on window panes, and *Pyrausta purpuralis* at *Nepeta hederacea* on the 26th. Two days later I saw, and identified, the first *A. euphrosyne*, on which day also I boxed a *Eupithecia satyrata*. In my cages out of doors a *B. betularia* emerged—an unusually early date. On the same day, a little before 2 p.m. G.M.T. an Iron Prominent hatched. *G. bidentata* was seen occasionally until 15th May.

May included almost every conceivable type of weather, from windless days to tempests, from murk to daylong sunshine, the barometer oscillating between 27.9 and 30.1. On the 4th I saw two Burnets on the wing, perhaps *Z. filipendulae*, and by now *A. euphrosyne* was well out. *L. chlorosata (petraria)* and *P. macularia* flew in the sunshine, and on the 5th I noted the first *Heodes phlaeas*. *Thecla rubi* was rather worn by this date, when I came across a small colony high up in the hills. This little butterfly occurs in the foothills of Plinlimmon at a height of about 2000 feet. Later in the afternoon of the 5th I saw *L. argiolus* (a rare butterfly here) flying about a larch plantation, and caught it to identify. *E. tages* and *E. alternata (sociata)* were first noticed on this date. On the 15th *C. mendica* occurred and on the 16th *D. binaria* (the first I ever saw in Wales) *X. montanata*, *C. glaucata*, and *B. prasinana*. A nicely marked ♀ *P. macularia* obligingly laid 17 ova—oval-ellipsoid, very pale, yet bright, green. The larvae were all easily reared on *Teucrium scorodonia*. On 19th May I watched a *H. tityus* feeding at *Scilla nonscripta* at my feet and the following day saw several at Marsh Lousewort in a Scabious-covered bog. The same day brought *D. lacertinaria*, *Eupithecia venosata*, *O. luteolata (R. crataegata)*, and *D. trimacula*. On the 20th *Bupalus piniaria*, *T. obelisca* and *I. lactacaria* were netted, and in the afternoon I found three young larvae of *A. flavicornis*.

22nd May brought another *D. trimacula*, several *E. venosata*, *E. hastata*, *D. pudibunda*, and the first *Hesperia sylvanus*, as we used to call the Large Skipper in the days of my youth. Thanks to gymnastics which I had believed to be impossible for a man of my age, I caught two or three more *E. hastata* during the ensuing days, but unhappily was unable to obtain eggs. The only other species recorded during the remainder of the month were *C. punctaria*, *S. floslactata* (*remutaria*), *P. fuliginosa* (a nasty, bad-tempered female who, although freshly emerged, refused to attract a mate and died a virgin after laying 21 infertile eggs), *E. tristata* (not uncommon this year but so local as to be confined to particular small clumps of birches in widely separated localities), *Eupithecia lariciata*, *E. pulchellata*, *H. lupulina*, and *S. malvae*. The *C. mendica* found on the 15th laid small batches of ova on six successive nights, viz., 3, 12, 5, 8, 11, and 13. All proved infertile. I had more infertile eggs this year than in any year I can recollect.

June was remarkable chiefly for rain and storm, rain predominating. On the 6th I found more larvae of *A. flavicornis*, some ova of *N. dromedarius* on birch, and boxed a fresh *M. albicillata*. *E. glyphica* was first seen on 9th June, and in the evening a male and a female Bufftip were netted at rhododendrons (they were courting of course). Next day I boxed *E. silacea* and *C. pusaria*. On the 12th I found a female *A. leporina* at rest on a white birch trunk, a remarkable example of pro-crypsis. This day I noticed the first Meadow Brown, and the following day a *V. cardui* crawled on to my hand from some dead bracken. 17th June brought *O. atrata*, flying, as usual, about a patch of *Conopodium*, and, to my discomfort, a great many *Hippobosca equina*. I also saw, on this day, a newly-emerged *A. aglaia*, its wings still limp, and on an oak *A. psi*, as common here as it is elsewhere. *C. punctaria* was boxed on the 21st, and on the 24th I saw the first *A. hyperantus*. Next day I collected larvae of *B. parthenias* and *A. flavicornis*, and on the 29th I saw, and identified, *A. adippe*, on which day also *Z. loniceræ* was on the wing.—(To be continued).—P. B. M. ALLAN.

MICE EATING INSECTS, ETC.—In connection with Mr S. G. Castle Russell's note (ante p. 122, 1943) on mice eating butterflies, and his inquiry as to whether other entomologists have noticed attacks by mice, I have had an experience of the kind lately. A mouse had recently got into the house and we noticed it in the downstairs rooms for several days. A House Cricket (*Gryllus domesticus*, Curt.) lived in the dining-room. One could hear it "chirping" somewhere in the daytime and at night it would sometimes run about near the fire. There was also a large house-spider which we had seen in the evenings, for some months past, running across the room. The mouse disappeared in a few days; but we never saw either the cricket or the house-spider again! Mr Russell's and this note refer to living creatures being eaten; but mice also eat dead insects. My first collection of beetles was destroyed by mice. I was about nine years of age at the time, and I kept my beetles in a fig-box covered with a sheet of glass. The box I kept in the tower attached to my father's country house, the mansion at Earl Shilton in Leicestershire. To my great distress, mice managed to get the glass lid off and devoured all my beetles.—HORACE DONISTHORPE, Entomological Department, British Museum (Nat. Hist.).

AN ENTOMOLOGICAL MYSTERY.—One of the most intriguing and interesting of my collecting experiences occurred on 20th May 1922, and I have never been able to find a satisfactory solution of the incident. In the morning I was collecting with my wife in an enclosure in the northern part of the New Forest, and my wife, who was in one of the rides, called out to me that there was a small white admiral settled on a shrub which she could not get at, owing to the bramble bushes. Thinking that it could only be a small specimen of *Limenitis camilla* out long before its proper time I did not hurry to join her, and when I arrived at the spot the insect had moved elsewhere and out of her sight. I remained in the ride, however, on the chance of it returning, and my wife took up a position in another ride a short distance away and which crossed the ride I was in at right angles. After a short wait she called out that the butterfly had passed her and appeared to be making for the ride where I was waiting. Sure-enough, the insect passed me, turned, and repassed me, on both occasions flying so low and rapidly that I did not attempt to net it, hoping that it would stop and settle to feed and ensure an easy capture. Unfortunately, the butterfly did not settle and shortly after flew into the interior of the wood, from which it did not again emerge, as the sky clouded over and the sun did not reappear for the rest of the day. On the two occasions that the insect passed me I had a clear and good view of it and in appearance it was similar to *Araschnia levana* var. *prorsa*, the beautiful net-like pattern of the black forewings being prominent. On arrival home I asked my wife to look at the figures in my copy of Hübner and she without hesitation picked out the figure of var. *prorsa*, thus confirming my own impression of the insect. She had a good view of the butterfly when she first saw it at rest with its wings outspread settled on the shrub. Now comes the mystery: if our identification of the butterfly was correct, what was it doing in the New Forest and why was it of the var. *prorsa* form, which I understand occurs in the autumn on the Continent? It was most unlikely that it could have been a released bred specimen, as at that time the particular enclosure was a very inaccessible one and many miles from any railway station and could only be reached by motor car. For a long period both before and after the incident I never met another collector in the locality, nor did I know of any such residing in the district. The only solution that I could think of was that the butterfly was an aberration of *Argynnis euphrosyne* or *Argynnis selene*. An occasional specimen of the latter species was seen in the ride during the season, but only single specimens, and there were no open spaces within some 200 yards in which either species occurred in any numbers. If the insect was an extreme aberration of *selene* it was extraordinary that the form should so closely resemble var. *prorsa* (*levana*). Unfortunately, I was unable to visit the enclosure again during the following week, and I fear the incident must always remain a mystery to me, as apart from the possibility of the butterfly being an aberration of *A. selene* or *A. euphrosyne* I cannot see any other solution.—S. G. CASTLE RUSSEL. [Perhaps it was *prorsa*. In 1913 and 1914 several examples of *Araschnia levana* were taken at Symond's Yat where there was a flourishing introduced colony, which was later destroyed by A. B. Farn. Possibly others were liberated in the New Forest.—T.B.F.]

NOTODONTA DROMEDARIUS, L., ON HAZEL.—On page 96 of vol. iv of this Journal (October 1943) I wrote: "I have never found . . . *dromedarius* on hazel." After those words had been printed, namely, on 31st August 1943, I found, here in Montgomeryshire, at an altitude of about 750 feet, a larva of this species, in its last instar, on hazel. On a birch adjoining the hazel bush there was a smaller *dromedarius* larva.—P. B. M. ALLAN, Newtown, Montgomeryshire.

HEMEARIS LUCINA, L., IN THE NEW FOREST.—In his interesting account of butterflies seen in the New Forest in 1943 (vol. iv, p. 103) Colonel V. R. Burkhardt makes no mention of the "Duke of Burgundy" fritillary. In the 'nineties of last century I used to find this little butterfly in several spots within a six-mile radius of Lyndhurst. Has it now disappeared? And is *Apatura iris* no longer to be found within the metes of the Forest?—P. B. M. ALLAN.

BUTTERFLIES PROTECTED ON BOTH SIDES WHEN IN FLIGHT.—The note given on this subject (*ante* Vol. liv, p. 4) is confirmed by an observation made by the late Roland Trimen (*S. Afric. Buttf.*, Vol. iii). *Iolais silas*, Westwood (and other allied species) has a brilliant blue upperside and a white underside. Trimen says that the shining white of the underside, which looks so extremely conspicuous when closely examined, is really protective to the insect when sitting amongst glossy leaves in full sunshine. In flight it is almost invisible from underneath.

Another well-known species, *Myrina ficedula*, Trim., has a very brilliant blue upperside and ferruginous brown underside. In flight a flash of blue is seen for a moment, then it disappears, as if by magic, at the closing of the wings. The direction of its flight is thus made very difficult to follow, though this particular species seldom flies any great distance from its food plant. At rest the underside is so highly protective as to make it indistinguishable from the small brown fig leaves amongst which it sits, keeping its long tail in constant motion. The protective colouring thus assists the insect to avoid its enemies, both in flight and at rest. There is no doubt that similar protection aids the whole family of Lycaenids in varying degree.—(REV.) DESMOND MURRAY, Leicester.

GALL-MIDGES ON THE ASPEN IN THE HEBRIDES.—In the Scottish Western Isles the aspen is a very abundant tree, growing on mountain cliffs and in stream gorges everywhere. However, with the exception of the moth *Cymatophora* or, its insect tenants are very local in their distribution. In fact, until 1942, despite careful searches, only one species of Cecidomyid attached to the tree had been found in any of the Hebrides. That species was the species *Harmandia tremulae*, Winn., found galling the leaves of aspens growing on cliffs overhanging Loch Bhràig on the Isle of South Rona. In 1942 *Perrisia populeti*, Rübs., turned up on South Uist. Finally, last season, a beautiful thicket of aspens in a gorge on Mullach Mor, Isle of Rhum, produced numbers of the spherical galls of *Harmandia petioli*, Kieff., on the petioles of the leaves. Even in this case the distribution of the species on the island was anomalous. Although the tree occurs in suitable spots over very wide areas, the insect was restricted to this single station on the Torridonian Sandstone in the north of the island.—(PROF.) J. W. HESLOP HARRISON, King's College, University of Durham, Newcastle-upon-Tyne.

OPORINIA FILIGRAMMARIA, ETC., IN THE ISLE OF RHUM.—During August 1943 *Oporinia filigrammaria* was observed on Rhum for the first time on the moorlands below Hallival, although in no great numbers. Its congener, *Oporinia autumnata*, occurs likewise on the island, for larvae were beaten from birch on both sides of the Kinloch Burn near its mouth in 1942. Last year, the icy blast accompanying the sleet which struck Rhum in May not only stripped the leaves from the birches but, in addition, so reduced the quantities of larvae present that none fell into the beating tray; nor did those of *Operophtera boreata*. On the other hand, *O. brumata* were knocked from lime in small numbers.—J. W. HESLOP HARRISON, King's College, Newcastle-upon-Tyne.

EULYPE SUBHASTATA, NOLCKEN, IN THE HEBRIDES.—Now that the "Argent-and-Sable" attached to the Sweet Gale (*Myrica gale*) has been recognized as a distinct species, it is necessary to record it from the Isles of South Rona, Fladday, Raasay, Longay, Scalpá, Pabbay, Soay and Skye in the Inner Isles. As the food plant has a very erratic distribution in the Hebrides, that of the insect must be peculiar likewise. Thus all Lewis (Outer Hebrides) records must be from stations north of Loch Soval, whilst there can be none from Harris, where the plant fails; nor are any likely from North Uist, where Sweet Gale possesses one habitat, and is not plentiful there. In South Uist the shrub is locally not uncommon; still a careful search in 1943 revealed no traces of the larvae. We have recorded "*Eulype hastata*" from Rhum in the Inner Isles, but that was a lapsus for Skye. To be precise, not until last season was Sweet Gale seen on Rhum, and then only as two patches covering in all an area of two square yards. Both the plant and *Eulype subhastata* occur on the neighbouring Isle of Eigg.—(PROF.) J. W. HESLOP HARRISON, King's College, Newcastle-upon-Tyne. [In Arctic Russia larvae of this species feed on *Vaccinium myrtillus* and *V. uliginosum*. Sweet gale does not grow there.—E.A.C.]

AN APPARENTLY NEW FOOD PLANT FOR VANESSA CARDUI.—During the past year a strong migratory wave of the Painted Lady entered the Western Isles, of which part reached Rhum. That contingent striking the island near Harris oviposited near the coast on the Creeping Thistle (*Cirsium arvense*), whilst that passing up the neighbouring glen utilized the Carline Thistle (*Carlina vulgaris*) for the same purpose. This is the first time I have seen it so employed.—J. W. HESLOP HARRISON, King's College, Newcastle-upon-Tyne.

CURRENT NOTES.

IN Vol. xlvii (1935); in Vol. xlviii (1936); and in Vol. lii (1940) of the *Ent. Record* we published Notes on the "Early Stages of Oriental Palaearctic Lepidoptera," from E. P. Wiltshire, our Correspondent in the East. A further addition to the above was given in the *Mitt. Münch. Ent. Ges.*, xxix, 1939. A plate illustrating these larvae was contributed to each section. There now lies on our table a further contribution with plate published in the *Journ. of the Bombay Nat. Hist. Socy.* Each larva is represented in a characteristic position on its food-plant. A description of each larva is given, with its foodplant, its

range so far as known, and the period of flight of the imagines. We must congratulate Mr Wiltshire on doing exactly the work which will be of most use for future study, and in taking such advantage of residence in districts more or less unknown entomologically. There are 14 pp. large 8vo of matter, with illustrations contained on 2 plates of 47 figures illustrating the 38 forms described.

A DOUBLE part of *Eos*, the *Revista Espaniola de Entomologia*, Vol. xix, pts. 2-3, has just reached us. The articles include descriptions of new species of Hymenoptera and Coleoptera, Orthopterous Studies, a new Dipterous Gall-fly, the Phasmidae of Borneo, and the *Aleyrodidae* of Spain, with a plate and many text figures. Another series of notes on the Natural History Bibliography of Spain is a supplement. Accompanying the part were further sections of the "Hymenopterous Tribes of Spain," pp. 241-288, with an admirably clear and well drawn figure of each Tribe discussed in these sections, some 29 in number. When concluded, this work should be a most useful book of reference to all students of the Order Hymenoptera. The work has reached the XXI, Fam. *Scoliidae*. These figures are all sufficiently enlarged to give really accurate external structures, wing-venation, antennal structure, hairs and distribution of them over the body and limbs. The arrangement of the matter as regards space is somewhat unusual. There is ample room to enter MS. notes to each Tribe dealt with.

OUR contributor, Prof. Bryan P. Beirne, M.A., F.R.E.S., etc., has published two very valuable memoirs in the December number of the *Economic Proceedings of the Royal Dublin Society* (Vol. iii, pts. 15, 16) on the Biology and Control of several common, small moths, which at times are very noisome pests in our gardens. (1) The Small Ermine Moths, *Hyponomeuta* spp., which attack fruit trees, especially the apple, and are harboured by the common hawthorn. (2) The Raspberry Moth, *Ineurvaria rubiella*. The first memoir is well illustrated by a considerable number of figures, and discusses *H. padella* with its races *malinella* and *variabilis*, which were formerly held to be separate species. The typical form feeds on the Hawthorn and often a portion of a hedge is completely stripped of its foliage. The author divides his account into various sections:—Distribution of the species around Dublin; Eggs and Young Larvae; older Larvae; Pupae, and Adults are fully discussed. Then he describes the Natural Controls such as Birds, *Gregarina* spp., various groups of Hymenoptera, Diptera, etc. Finally, there is a short section on the most effective Artificial Controls. Both *H. cognatella* and *H. evonymella* are similarly but more shortly dealt with. The second memoir is then dealt with. Both memoirs are most interesting and thorough, and based on the facts obtained by Prof. Beirne in the area around Dublin.

A "DIRECTORY OF THE NATURAL HISTORY SOCIETIES" of the British Isles is now in course of preparation for publication by the *Amateur Entomologists' Society* in the near future. Its aim is to make known the existence and work of Societies interested in any branch of natural history (except economic, agricultural and medical problems), from general science to botany or zoology, conchology or mycology, microscopy or nature photography, systematics or ecology, phenology or marine biology. One aim of the publication will be to show to members of school socie-

ties that their small gathering is not a mere scholastic activity, with which they need not lose touch on leaving school, but part of a larger movement. Another use of the Directory will be for those visiting a new district to meet local entomologists, ecologists, or whatever their speciality, with the minimum of delay. The compilers wish to include as large a number of such organisations as can be brought to their notice, from national Associations and regional Unions down to county, town, university or school Societies. It is proposed to send a printed memorandum to all Societies, asking for details of their address, foundation date, subscription, number of members, publications, meetings held, possession of library and reference collections, etc., for completion and return. Names and addresses of as many organisations as possible, particularly of school and college organisations and the smaller clubs and societies not affiliated to any Naturalists' Union, are urgently needed, and the compilers will be very grateful indeed for any help that readers can give. Replies should be addressed to Mr W. G. RAWLINGS, F.R.E.S., 14 Westfield Park, Bath, Somerset.

For some years Mr D. G. Sevastopulo, F.R.E.S., of Calcutta, has collected and bred all Lepidopterous larvae which he has met with. We have just received eleven separates giving the life-history, descriptions of all stages of the larvae if possible, recording all dates, and with food plants. Where necessary the different instar forms, as in Sphingids, are given; in *Chloridea obsoleta (arnigera)* he describes five forms. These notes have been periodically published in the *Jour. Bombay N.H.S.* and form a fine addition to our knowledge of the Indian Fauna. Incidentally, we note that when referring to the typical form as a subsp. he writes, what some of us think the correct way, e.g., *Pareba vesta*, F., *vesta*, and not *Pareba vesta vesta*, F., which obviously is wrong. Such persistent observation and recording when opportunities occur is a most commendable addition to the spread of human knowledge. Not only has the author produced the above but he has gone through some of the literature he has at hand, and has collected information on the food plants upon which Indian Bombyces, Agaristids, and many Noctuids feed, and of this research the *Jour. Bombay N.H.S.* has already published two separates.

On 12th November, under the auspices of the Royal Entomological Society, with Dr E. A. Cockayne, D.M., F.R.E.S., F.R.C.P., President, in the chair, a joint meeting was held with representatives of the British Ecological Society. It was taken for granted that all who took part should have knowledge of the Objects of the visiting Society, whose efforts are the consideration of the Environment of Soil, Water, Light, Heat and Climate upon Vegetation, the Biological Factors in the Life of the Plant, and the Associations of Plants in the British Flora, aquatic, moorland, grassland, woodland, bogland, etc., with no direct connection with Economic Agriculture, or with Economic Pestology.

The Introduction was by Prof. C. J. Salisbury, F.R.S., who dealt with his subject from the purely botanical side as influenced by the varied attention of the insect population in different areas. He concluded by stating that the knowledge of such associations would no doubt be of use in agriculture.

Dr Cockayne gave instances of *Macrolepidoptera*, the larvae of which are attached to one species of a genus of plants, to one or two species of allied genera, or to a whole genus. He also gave a few instances of larvae, which have only two food plants unrelated botanically, and suggested that these must contain some chemical substance in common.

Capt. C. Diver gave a long and interesting series of instances in which insects were controlled by the general conditions under which the plant communities existed, flourishing or otherwise.

Dr C. F. C. Beeson, another member of the Ecological Society, took up the particular case of the influence and control by insects in the composition and destruction of Forests.

It would thus appear that these two Associations were working on parallel lines; the one engaged with the Biology of Insects and the other with the Biology of Plants and with a very great deal in common.

OBITUARY.

Louis Beethoven Prout died on 31st December 1943 at the age of 79. He was the son of Ebenezer Prout, the famous musician, and was himself a talented pianist. In his earlier years he bred and collected *Lepidoptera*, but he had to give this up as Systematic Entomology made increasing demands on his time.

Prout was the world's greatest authority on the *Geometridae*. He wrote the sections on this group for Wytzman's *Genera Insectorum* and for Seitz's *Macrolepidoptera of the World*, and at the time of his death was engaged in completing the supplement to the latter. He also wrote many of the parts on the *Geometridae* for the *Catalogus Lepidopterorum*. He contributed many short papers, chiefly on taxonomy, to various periodicals, and some of greater length to the *Bulletin* of the Hill Museum.

He was an indefatigable worker and much of his reputation was due to his great knowledge of entomological literature and to the extreme care he took in verifying references and making detailed notes of original descriptions. Though old in years he remained young in mind, and was always ready to readjust his views in the light on new discoveries. He believed in basing classification on as many characters as possible, attaching considerable weight to the biology and early stages. He had always been interested in parallel variation and wrote an interesting paper on the subject in 1904, and after the rediscovery of Mendel's work he became interested in genetics and held strong views on the desirability of giving the same name to parallel genetic forms whenever possible. Some years ago he gave his Collection to the British Museum.

He was an active supporter of the City of London Entomological and Natural History Society, attending its meetings regularly and reading papers before it, and he acted as its President from 1899 to 1904. He was an Honorary Vice-President of the London Natural History Society and a Special Life Fellow of the Royal Entomological Society of London.

Everyone was fond of Prout, for he was modest and unassuming and unsparing in his efforts to help his fellow entomologists. He will be mourned in every country, for by his passing the world has lost one of its greatest taxonomists.—E. A. C.

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which are not going into hibernation.—Dr H. B. D. Kettlewell, Cranleigh,
Surrey.

Desiderata—British *dominula* varieties with full data other than ab. *lutea* and
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Wanted—American HesperIIDae, especially from Costa Rica, West Indies, the
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Write K. J. Hayward, Estación Experimental, Casilla Correo, 71, Tucuman,
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Duplicates—*Rhopalocera* from China and Peru, in papers, perfect condition,
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John W. Moore, 151 Middleton Hall Road, King's Norton, Birmingham, 30.

Wanted—Living larvae of *Pteris rapae*, and cocoons of *Apanteles rubecula* or
Apanteles glomeratus gratefully received. Large numbers required for Re-
search purposes. Postages, etc., will be paid.—Dr Ewen Cameron, Imperial
Institute of Entomology at Clunebeg House, Drumnadrochit, Inverness.

Desiderata—Dipterous parasites bred from Lepidopterous larvae or pupae, or
from any other animal.—H. Audcent, Selwood House, Hill Road, Clevedon,
Somerset.

Wanted.—*Lycaena (Heodes) phlaeas* from all regions including British Isles.
Also wanted other species of Chrysophanids from all areas. Exchange or
purchase considered. Duplicates.—Foreign Lepidoptera, e.g., Satyrids,
Charaxes, Papilios, and others; full lists sent.—P. Siviter Smith, Little Aston
Park, Streetly, near Birmingham.

Book Wanted.—Barrett, *British Lepidoptera*, Vol. 3; also Brady or Gurney Cabinet,
20 or 40 drawers.—L. E. Savage, 65 Cranmer Avenue, Hove 4, Sussex.

Books Wanted.—"Draudt-Seitz Suppt., Vol. III (Noctuae)," English preferred.—
A. J. Wightman, "Aurago," Pulborough, Sussex.

Desiderata.—Frohawk, F. W. "Varieties of British Butterflies" (1938). Buck-
ler's *British Larvae* ('86-'01). For disposal, "Entomologist's Record," com-
plete, Vols. 1-28 hlf. cf., 29-55 wrappers.—A. F. L. Bacon, The Malt House,
Burghclere, Newbury.

Desiderata.—Wanted a pair of *Argyrophorus argenteus*, the silver butterfly of
Chili. Suitable exchange or cash.—S. G. Castle Russell, "Springetts," Sea-
view, Highcliffe-on-Sea, Hants.

Wanted, many species of ova, larvae and pupae, also Barrett's *British Lepidop-
tera*, Tutt's *Practical Hints*, and Buckler's *Larvae of British Lepidoptera*.—
Pickard, 36 Storeys Way, Cambridge.

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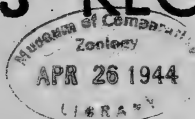
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MARCH 1944

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EDITED with the assistance of

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TWO VISITS TO THE HAMMAR LAKE.

(24th May and 14th November 1943.)

WITH A DISCUSSION OF *S. IRAQIAN* MARSH FAUNA.

By E. P. WILTSHIRE, F.R.E.S.

(Cartographers apply the name Hammar Lake to the whole; local usage to the part; the author here follows the former.)

(Concluded from page 16.)

On 14th November a North wind was again blowing, and the day was bright and sunny, like a perfect English summer day, but crisper. To-day our chief aim was wild duck. The water was now only an inch or two above its lowest limit, and vast tracts, previously covered with water, were now high and dry, enabling us to cut short our journey by driving along a more direct route across the exposed alluvial plain. It was without a vestige of vegetation for most of the way, a scorched mud desert with a little wind-blown dust on top. In one place, however, where a few dried reeds and rushes stood forlornly up from the parched soil, the smooth surface had been spoiled. My host assured me that these places, in the form of rather rough depressions about two or three inches deep, had been caused by fish feeding in shoals a few months earlier. We christened them fish-warrens, and cursed them, for they slowed us down; elsewhere, a high speed over the flats was possible.

A huge black column of smoke towered on the north-western horizon; it was a reed-fire on the north shores of the Hammar Lake. The Arabs burn off the dry reeds to improve grazing for their animals next spring (similarly the Kurds burn off the sere grass on their rolling hills in October).

Arriving at the village, we found its aspect quite changed. The reed-huts now stood, nearer to the bulrushes, in the midst of verdant crops of maize, melons, and pumpkins. It at once occurred to me that the specimen of *S. zaeae*, taken in May, might have bred in last year's maize and somehow escaped alive from the waters into the bulrushes; certainly the tall fields of maize now ran right up to the landward edge of the green, taller bulrushes.

Three muzzled donkeys were treading out maize heads on a small circular threshing-floor, circling around a central rusty petrol-tin. The village's water-melons were large and sweet.

After lunch we pushed off in three boats through the same channel, beginning from the lone tamarisk. I still saw no other species of plant in the bulrush-bed but *Typha*. The bulrushes ended where the water was now only three or four inches deep. At their outer verge another species of rush grew which I tentatively identified as a *Scirpus*; it resembled the smaller of the two foodplants of *A. algae (cannae)* in the Norfolk Broads, the second of its foodplants there being *Typha*, of course. A Norfolk lepidopterist would have betted on finding the moth there, unless he knew Iraq!

For a long way out the water was very shallow, hardly deeper than six inches; the bottom was overgrown with a kind of water-weed. On these shallows the duck, halting on their southward migration, were feeding in thousands. We could hear the honk of geese, too. Solitary, tame storks walked gravely through the shallows, at a greater depth



13,820

and nearer the boats than the duck dared. Our boatmen speared two mud-fish hereabouts, which proved excellent eating, being almost boneless, though of an unprepossessing appearance. The duck were of many kinds: mallard, gadwall, teal, widgeon, pochard, pintail, etc. All were migrants. According to our host, only the marbled duck (*Anas angustirostris*) breeds through the summer on these waters.

We sat in bulrush-hides. The marsh-Arab attending each of us pounced on our first birds; if only winged, he wrung the neck; then he inserted in its beak a short length of bulrush stuck in the mud in a patch of open water near the hide, leaving the duck a life-like decoy floating on the surface. Subsequent hits were similarly utilised.

Our host, evidently a good shot, brought back eighty duck and two geese, not to mention a spoonbill (his villagers eat this bird) at the expense of 120 cartridges. Our own percentage of hits to cartridges was, alas, not so good, but we had had far less practice than he. On his two previous visits our host had secured respectively eighty and a hundred duck. It was evidently a fowler's paradise!

But I will say no more of birds, nor mention the other kinds seen, for I am no ornithologist and this is, indeed, not the right place for ornithological details. Suffice it to say, we were more than satisfied with the sport, and, later, with the good fare furnished by the Hammar Lake in November.

We returned to the village at sunset, an unforgettable sunset. The wind had dropped; the rushes we had left formed a black line dividing a fiery copper sky, to the south and west of us, from a copper, tranquil lake. To the north the lilac-grey sky merged imperceptibly into the lilac-grey lake, no shore being in sight. Not a tree was to be seen. In the north-east the lurid orange flames of the reed-fire were to be seen on the horizon, and across the whole northern sky an arc of grey smoke marked the long course the fire had run during the day from west to east.

It was dark on our arrival at the village and I hastened to light the lamp and spread the sheet. Again *Nymphula affinalis*, Guen., came in swarms, but except for two or three *Hyphilare loreyi*, Dup. (a migrant grass-feeder, commonest in oases in Iraq) no other species was seen. Nor did walking into the bulrush-bed with the light produce anything else.

A brief visit to the edge of the high desert, however, produced two species of Lepidoptera in fair numbers before our return over the mud flats.

Thus no characteristic marsh-moth was taken on either of my two visits to this marsh locality, unless the single unidentified micro (BM. 32) proves to belong to a marsh ecofauna.

I had, of course, not neglected to examine the beds of rush during the afternoon and quickly decided that no large borer-moth inhabits them, and probably no smaller borer such as *Orthotaelia sparganella*, Thunb. Whether or not there is a species of borer in the reed-beds (*Phragmites*) elsewhere in S. Iraq, I do not know, not having been able to examine them yet, but I think that *Phragmataecia castanae*, Hüb., will be found there, where reed is plentiful and perennial, for, as tabulated above, I have found it in Khuzistan, and it is also known from the Tropics, according to Seitz.

Had *typhae* been present I would hardly have missed signs of it, even had I visited the marsh at the wrong season; as English lepidopterists know, its galleries and exit-holes are conspicuous and unsightly and are furthermore often slashed open by marauding water-fowl (moorhens, etc.). Incidentally, I saw none of these fowl among the Hammar *Typha*-beds, though they are common in the Kurdish mountain streams of N. Iraq where *Typha* grows. Why should this moth be absent from S. Iraq? Not on account of the change in water-level, for the plant is common also in the ditches of the date-palm gardens around Basra and equally devoid there of trace of moth and bird. The reason must be climatic; *typhae* is a Euro-Siberian moth and the plain of Iraq is too torrid. It will, however, be seen from the table given with this article that it occurs south of Basra at heights where winters are colder and summers less prolonged.

Lest I be accused of concentrating on a narrow group of moths, let me here add a list of marsh moths taken by myself at Amik marsh, Coele-Syria, in 1934, other than those already mentioned:—*Phragmatobia fuliginosa*, L., *Scopula flaccidaria*, Z., *Diatraea luteella*, Motsch., *Nymphula stratiotata*, L., *Nymphula nymphaeata*, L., *Cataglyphis lemna*, L., *Orthotaelia sparganella*, Thunb.

Not one of the above is known from S. Iraq. *Chilo suppressalis*, Walk., and *Schoenobius incertellus*, Walk., are known from S. Iraq and are perhaps marsh-moths, but I did not find them at the Hammar Lake.

A similar state of affairs seems to exist in Crustacea, witness the opinion of Gurney (3), who writes on the Crustacea of S. Iraqi marshes as follows:—"My expectation had been that the district of Amarah would have been a very favourable one for Phyllopoda and also that the Entomostraca would show a distinct mingling of eastern and western forms, but these expectations have not been realized. Only two species of Phyllopod. are included in Dr Buxton's collections and the remaining Entomostraca are, with the exception of *Daphnia holtzi* and *Moina dubia*, of a European type. Between Basra and Amarah there are immense areas of permanent shallow marsh on either side of the Tigris, generally some way from the river. The fauna of these marshes was sampled by Dr Buxton at Azize, Kharaba (East of Amarah) and at Ezra's Tomb on the Tigris between Amarah and Basra. Though 15 species were taken at the latter place the fauna seems to be surprisingly scanty. Dr Buxton suggests that the scantiness of the fauna may be due to the intense sunlight and high temperature of the shallow water during the day-time in summer, or to the daily great fluctuation in temperature."

A kind of parallel also exists in the bird-fauna, for Ticehurst, Buxton and Cheesman (4) say of the Hammar Lake:—"In winter countless myriads of wild-fowl immigrate there . . . In summer it would appear to be ornithologically not so interesting."

I imagine that the seasonal disparity in the avifauna of S. Iraq is far greater than that of an English marsh.

³"Fresh-water Crustacea collected by Dr P. A. Buxton in Mesopotamia and Persia," by Robert Gurney (*Journ. Bombay N.H. Soc.*, 31st July 1921).

⁴"The Birds of Mesopotamia" (*Journ. Bombay N.H. Soc.*, 30th December 1920).

To return to Lepidoptera, in none of the marshes of the Middle East that I have visited have I found one endemic species. The characteristic genera of the Middle East (*Melitaea*, *Nychiodes*, *Armada*, *Agrotis* (*Dichagyris*), *Elaphria*, and so forth) contain no Middle East species belonging to the marsh ecofauna. It seems a fact that the marsh is the most alien or exotic kind of biotope in the Middle East landscape.

My hope, expressed in a previous article, that "the Euphrates marshes contain some highly interesting secrets," seems doomed to disappointment.

The Lepidoptera characteristic of Middle East marshes are, it will have been noted, mostly Euro-Siberian. One of the exceptions, *sohn-retheli*, is presumably to be classified as Mediterranean, and the others, *P. castaneae* and *D. luteella*, are Tropical.

A marsh is a special kind of oasis biotope. In other publications (5) I have observed how in arid climates of the Middle East, Euro-Siberian and Tropical species penetrate most easily in oasis-biotopes, where, no doubt, the higher humidity enables them to exist. Iraqi oases in general certainly produce a higher percentage of Euro-Siberian and Tropical species than the surrounding desert or steppe country.

The general conclusion from the above opinions and observations seems indisputable, that *the southern shores of the Hammar Lake, and very probably all the S. Iraqi marshes, are relatively unfavourable to life.*

Furthermore, it can be said that the S. Iraqi marsh-biotope is a desert compared with other S. Iraqi biotopes, desert or oasis, and lacks the marsh ecofauna found in other Middle East marshes.

The example of *typhae* discussed above showed that the fluctuation of the water-level could not be responsible for this moth's absence; nevertheless, water-level-fluctuation is, in my view, an important factor in the impoverishment of the S. Iraqi marsh-fauna, especially since it operates in combination with the factor already suggested, namely, extreme and prolonged heat. I think it probable that the limited number of hydrophytic plants along the low-water limit of the Hammar Lake is due to the great fluctuation in the water-level. The sterility of the alluvial flats must also be due to the same cause, for desert plants are prevented from growing thereon by the four months' inundation, while water-plants are killed off by the eight months' drought and heat.

The reason for the fluctuation is, of course, climatic. No rain falls during the long summer, either in the plain or the mountains, from which the rivers of the plain derive their water. The peak-floods of early summer are caused by melting snows in the Turkish, Iraqi, and Persian mountains, and a generally higher level between November and April can be attributed to winter rains in the plains and the mountains. High water on the Tigris at Bagdad is quite thirty feet above low water!

Although I have not yet been able to investigate any large S. Iraqi reed-bed, the above quotations from the *Journal of the Bombay Natural History Society* and the list of Lepidoptera taken by Buxton at Amarah

⁵"Insect biotopes in Syria, Iraq, and Iran" (*Ent. Rec.*, 15/iv/1940) and *The Lepidoptera of Iraq*, shortly to be published by the Department of Agriculture, Bagdad, both by the present author.

and published in the same journal (6) seem to indicate that these reed-beds are little if at all richer than the bulrush-beds visited. Furthermore, the natives' habit of burning hundreds of square miles of reed annually cannot be conducive to a rich insect life there.

There is another possible explanation of the poverty of the S. Iraquian marsh fauna—the recency of these marshes and their isolation from other marshes. Between them and the much smaller but richer marshes of Syria, Turkey, Kurdistan, and Persia, from some of which their waters are derived, the great rivers flow through deserts, with banks of sun-baked mud and no marsh plants. Where the S. Iraquian fresh-water marshes now stand, two thousand years ago the salt waters of the Persian Gulf lapped. Perhaps these marshes were formed unlinked faunistically with more northerly marshes; that they are and have always been quite isolated from more southerly marshes also, a glance at the map of Asia will suffice to show.

This explanation, however, cannot be offered here with much confidence, for, while it can indeed truly be said that these marshes did not exist in their present position two thousand years ago, yet similar marshes may well have existed then not so very far northwards. It is reasonable to suppose that there have always been fresh-water marshes in Mesopotamia, but that these have shifted southwards as the Euphrates-Tigris delta pushed southwards into the Persian Gulf. If so, the recency of the S. Iraquian marshes does not explain their poverty, and their isolation can only be invoked as explaining why a more northerly marsh-ecofauna cannot *now* find its way into them. The primary cause of the poverty is probably the climate.

In conclusion, may I appeal for a footnote by Fleet Paymaster Bainbrigge-Fletcher on the biology and range of *N. affinis*?

6“ Moths of Mesopotamia and N.W. Persia. Part I: *Noctuidae*, *Lemonitidae* and *Pyratidae*,” by Lord Rothschild (*Journ. Bombay N.H. Soc.*, 30th December 1921).

THE WHITEHOUSE COLLECTION.

On Tuesday, 25th January 1944, a second portion of the collection of British Lepidoptera formed by the late Sir Beckwith Whitehouse, consisting of butterflies only, was sold. There was a good attendance of buyers, amongst whom were many well-known and discriminating collectors. The prices realized on this occasion were decidedly more reasonable than at previous sales.

The total amount realized was roughly £750, excluding the 40-drawer cabinet, which was withdrawn at £34. There were 214 lots. Forty-one lots from the collection of Sir Murdoch McLeod, consisting of immigrant and extinct species, were also included in the sale, and realized approximately £106.

The following lots are selected as being of interest:—

Papilio machaon, L.—Lot 1, An example of the remarkable melanic form bred by Mr L. W. Newman—a fine male realized £13 10/—, a not extravagant price. Lot 2, A male with suffused forewings, £3 5/-. Lot 5—*Gonepteryx rhamni*, Linn., An uncommon form of gynandromorphism,

the forewings being mostly male and the hindwings female. Lot 12—*Euchloë cardamines*, Linn., An albino partly gynandrous, £11 11/-. Lot 13, A fine gynandromorphous specimen, left side ♀, right side mostly ♂, with two thin streaks of male coloration, £11 10/-. Lot 14, A male with buff tips, with two others, £5. Lot 15, A ♂ with the normal orange colouring very indistinct, £13 10/-. Lot —*Colias croceus*, Frery., A specimen with the left side var. *helice*, right hindwing *helice* and typical, right forewing mostly typical ♀, £15. Lot 22—*Gonepteryx rhamni*, Linn., An aberration with suffusion of deep orange over the central area of all wings, £11 10/-. *Apatura iris*, Linn., A ♂ ab. *iole*, £5 5/-. Lot 27—*Danaus plexippus*, A ♂ taken at Penzance, £5 10/-. *Nymphalis io*, Linn., A large ab. *belisaria*, £4 10/-. Lot 37—*Vanessa cardui*, Linn., A beautiful rayed example, Clapton, 1879, £16. Lot 38, A rare form with central areas of all wings without markings, £4 10/-.

Lot 42—*Argynnis paphia*, Linn., An unique gynandromorph taken at Lyndhurst in 1900 by E. Wiltshire. The right side is var. *valezina* and the left side typical ♂, with a few short streaks of *valezina* colouring on forewing inner area. Exhibited at the South London Society, 1900, £20. Lot 43, A var. *valezina* ab. *confluens*, of dull colour, £10 10/-.

Lot 47—*Argynnis cydippe*, Linn., A fine ♂ with forewings heavily suffused with black, £8. Lot 48, a ♀ ab. *confluens*, £5 15/-. Lot 49—*Argynnis aglaia*, Linn., A fine albino ♂ of light colouring, the normal spotting missing or faint, £20. Taken by C. P. Pickett, Folkestone, 1907. Lot 51, A beautiful melanic ♀, wings all black except marginal spots, Canterbury, 1906, £21. Lot 57—*Argynnis euphrosyne*, Linn., A male with spotless forewings and black hindwings rayed with buff, £9. Ulverston, H. Murray. Not in the best of condition and rather faded.

Lot 71—*Satyrus galathea*, Linn., A ♂ with excess of black and an albino ♀, £5 10/-. Lot 73—*Maniola jurtina*, Linn., A beautiful albino ♀ in bred condition taken by Col. Len. Wood, Trowbridge, 1936, £7 10/-. Lot 74, A ♀ of the golden form, £4. Lot 78—*Maniola tithonus*, Linn., A perfect male of the ab. *mincki*, Seebold, £3 10/-. Lot 85—*Thecla betulae*, Linn., An ab. *pallida*. Lot 87, An underside completely devoid of spots except for discoidals, £2 5/-, a low price for this exceptional rarity. Lot 93—*Heodes (Lycaena) phlaeas*, Linn., A straw-coloured ♂ with broad border, £3 7/6. Lot 99, A ♂ albino in poor condition, £6 10/-.

Lots 100 to 109—*Chrysophanus dispar*, Haworth, ♂ and ♀ specimens realized from £2 5/- to £7 5/- according to condition. Lot 111—*Aricia agestis*, Schiff., An extreme *radiata* on all four wings, £4 5/-, a decidedly low price. Lot 115—*Plebejus argus*, Linn., A gynandro right side ♂, left side mostly ♀, £1 4/-, a very low price for this well-conditioned insect. Lot 117, A fine *caeca* ♀, Kent, H. A. Leeds. Lot 120—*Polyommatus icarus*, Linn., An underside form of *glomerata-obsoleta*, a very rare form, £4. Lot 123—A perfect male Irish *caeca* in bred condition, S. B. Hodgson, Co. Mayo, 1929, £2 4/-.

Lot 126, A hybrid assumed to be by *P. icarus* and *P. bellargus*, 30/-. Lot 127, Hybrid (*coridon* and *oellargus*), £3 5/-. Lot 128—*Lysandra coridon*, Poda., An extreme ab. *marginata-latiora*, £4 10/-. Lot 129, An extreme form of ab. *livida*, £5 5/-, a very moderate price for this beautiful insect. Lot 132, an ab. *pallida-suffusa*, £3 15/-. Lot 137, An ab. *latiora*, £2 15/-. Lots 138 and 139, Two pairs of *pulla-suffusa*, £2

5/- and £2 10/- respectively. Lot 140, A ♂ *alba-obsolata*, £3. Lot 141, *alba-obsolata*, £4 15/-. Lot 142, A very fine ♂ *radiata* on all four wings, H. A. Leeds, Royston, £12 10/-, a price favourable to the buyer. Lot 143, A good example of *ab. obsolescens*, £3 10/-. Lot 144, A perfect *caeca*, £5 10/-. Lot 145, A fine *alba-radiata*, £7 10/-. Lot 146, An *alba-obsolata* minus lunules—a very rare form, £4. Lot 147, A fine example of *ab. mixtaelongata*, Royston, L. W. Newman, £10 10/-.

Lot 148, A fine example of *ab. fowleri*, a ♀, £12 12/-, a record price. Lot 156, A ♀ *ab. alba-obsolata*, with brilliant orange lunules, £5 5/-. Lot 157, A similar specimen, £4 5/-. Lot 158, A handsome *alba-radiata* ♀, H. A. Leeds, Royston, 1923, £9 10/-. Lot 160, A melanic ♀ under-side, £3 15/-. Lot 161, A fine *anti-digitata*, £5. Lot 162, A beautiful *alba-obsolata* with very large orange lunules—a striking aberration, £6 10/-. Lot 163, A fine *semialbescens-obsolata*, £3. *Lysandra bellargus*, Rott.—Lot 170, An assumed hybrid (*bellargus-icarus*), £2 10/-. Lot 174, A beautiful dark ♂, the central portions of forewings being lavender, £5. Lot 176, A form of *ab. czeke*, £2 10/-.

Lot 178, A deep black ♂, £11 10/-. Lot 179, A gynandro, £4 15/-. Lot 181, a pretty form of ♂ *albo-obsolata*, £4 15/-. Lot 182, A ♂ *caeca* form, £3. Lot 183, A fine semi-*alba-obsolata*, £5 15/-. Lot 185, An *ab. radiata* on all four wings, £9 5/-. Lot 186, A very pretty form of *alba-radiata* on all four wings, £12. Lot 191, An *ab. digitata* ♀, £2 10/-. *Lycaenopsis argiclus*, L.—Lot 198, A rare ♀ of slate coloration, H. Quarrington, £2. *Ochlodes venata*, Bremer and Gray—Lot 206, An albino form, £2 15/-. Lot 207, A semi-albino, £2 10/-. *Carterocephalus palaemon*, Pall.—Lot 209, The specimen with black forewings recently sold for £8 now realized £9 10/-.

The 40-drawer Brady cabinet, a beautiful piece of work, was withdrawn at £34.

SPECIMENS FROM SIR M. MCLEOD COLLECTION.

Chrysophanus dispar, Haworth.—10 pairs realized from £3 10/- to £10 10/- per pair according to condition. Six pairs of *Pontia daplidice*, Linn., 27/- to £3 10/- per pair. *Argynnis lathonia*, Linn.—Six pairs from 30/- to 35/- per pair. *Cyaniris semiargus*, Rott. (*acis*)—24/- to 70/- per pair. *Nymphalis antiopa*, L.—10 examples, 20/- to £3 each, according to condition.

All the lots in the Whitehouse sale were fully described with details of captor's name and locality.—S. G. CASTLE RUSSELL.

BUTTERFLY COLLECTING IN WOOD WALTON, HUNTS, AREA DURING 1943.

By H. A. LEEDS.

Following a mild winter vegetation was early, but five successive days of gales in late April with others following at intervals during early May caused much damage to trees and destruction of larvae. The elm feeders were almost annihilated; I tried beating elm trees in various parts, when the leaves were formed, and only two moth larvae of fair size were found, but a few days afterwards about a dozen full-fed larvae

of *w-album* were obtained by searching a thick sheltered quantity of young elms; later on a few were flying there, and one elsewhere. In 1942 this species was abundant in an elm plantation, but not one was seen there this year; the larvae are easily dislodged and some years back following a sharp gust of wind several were picked up from bare ground. It is probable that *pruni* larvae were depleted by the gales. The emergence commenced early as four were seen flying on 9th June; a few were taken up to the morning of 14th, when four in fair condition were retained and seven worn were released; this was followed by a thunderstorm, and heavy showers ensued for about a week. A visit to Monk's Wood on 24th showed that *pruni* was nearly over and only a few were seen; as customary, a few *C. rubi*, very faded, were noticed on the privet; when fresh out and so long as possible they frequent May blossoms. A male *camilla* was feeding on privet and several *galathea* and *hyperantus* were fresh out.

The next day, 25th June, I had a rather startling experience as after proceeding a few hundred yards along the main riding a terrific explosion occurred, about 80 yards away, throwing up earth and debris, a flight of Flying Fortresses was passing over the wood and two of them left the others and circled twice around the place, apparently to ascertain if a plane had crashed. Usually there was a noise in the wood, either of tractors pulling up the bushes and trees, or the loud conversations of Italian prisoners clearing up, but this morning everything had been so quiet. Knowing that blasting had taken place in more distant places I assumed it had commenced in the wood and hurried farther away and before reaching the extreme end of the wood other explosions followed, so crossing two fields the return journey was made on the roads. A fresh large female *c-album* and several fresh *urticae* had been seen. The blasting operations continued for some time and curtailed my visits, but rapid progress was made and by the middle of July possibly about 14 or 15 acres had been ploughed and levelled and, although late, potatoes were being planted on part of it; just previously another 14 acres had been set. These crops had not been lifted by the end of October, but judging from the thinness of the stems the yield would be meagre and small. Rather over 30 acres has now been cleared and a trial plot of about half-an-acre set at the proper time has produced a fair crop of potatoes. There are many thickets containing blackthorn still left in Monks' Wood and Mr H. Neaverson, the owner, does not desire to make a drastic clearance. Let us hope that the whole 400 acres of this noted wood may gradually be reafforested and ultimately return to its pre-1914 routine clearance of 20 acres of undergrowth with removing of serviceable trees and planting saplings. This rotation of 20 years allowed the growth of blackthorn and maintained the continuation of *pruni*, whilst other flora and fauna subsisted. Actually the time arrives when some of the thickets become so impenetrable that they are best removed.

Very fine weather prevailed from 14th May until the 29th, and it was most enjoyable to spend most of the time outdoors. In its beginning I noticed that the huge gyrotiller had stopped in this hamlet and enquiring of the driver found it was going to churn up last year's clearing in Monks' Wood. Knowing that some small blackthorns were left on the outskirts last year prior to August when *Thecla betulae* would be

flying and possibly deposit ova, I decided to beat for their larvae. At the entrance to the clearing commencement was made on three small single-stemmed blackthorns about a foot in height; the first tap deposited two on the tray and a third was obtained when beating the other two plants. This good start was not maintained, for only two more were found in three hours; however, it was easy to work as the tray could be placed on the ground and the plant pulled over with a hooked stick. On subsequent days one or two similar visits were made; twice the result was nil, once one, and the best yielded seven. After eight days, during which 14 acres had been ploughed, the gyrotiller left for a hilly ridge on the opposite (east) side of Wood Walton, where in the beginning of 1892 about 100 acres of bushes and a few trees covered the slopes of a bridle-way leading to Wennington, a large portion of which was cleared by tractors and Italian prisoners last year. Going to that place the next morning I found that 35 acres had been previously prepared and flax was being drilled. This sowing was late and the resulting growth was too short for the fibre to be used; although the linseed might be valuable, the greater portion of the seed fell out and the area was covered with small growth from them when the flax was pulled and stacked in the beginning of October. Flax is pulled up by the roots and a very complicated puller, hauled and worked from a tractor, is used for that purpose; this machine is in big demand and possibly was previously better employed on more fibrous crops which would also yield linseed. Some fair crops were grown on other hillsides here this year, but the quality was below that of last year's fibre.

Beating was commenced on some outlying blackthorns and soon afterwards the gyrotiller driver shouted to me to "watch the high bushes." A loud tearing noise was going on behind them and almost immediately a wide portion of them was advancing towards me; it seemed uncanny for what might be likened to a section of a high hedge to suddenly break away and come forward rather rapidly; getting to one side I found that a powerful bull-dozer was uprooting and pushing the bushes out for clearing away. They are trimmed and the best portions sold, by trailer loads, for firewood. It was my first experience of a bull-dozer and I realized its usefulness in clearing a way through scrub, etc., in foreign parts. Getting further away seven *betulae* larvae were found that morning; the results here were better than in the wood, 17 being obtained one evening, and by 29th May my circuit was completed long before uprooting finished. Some of the *betulae* were sent away for important experiments, part for introduction to an apparently suitable place in the Midlands, whilst the last eleven emerged as follows in July: males, 4th one, 5th two, 6th two; females, 7th one, 8th three, and 10th two.

When beating several moth larvae were saved from destruction by taking them to hedges containing blackthorn and distributing them on my way home. *Caeruleocephala* was common, and a few *T. crataegi*, *sphinx* (*cassinia*), *rhipicapraria* and *cucullatella* occurred; *brumata* and the cannibal *trapezina* were killed. In August a male *betulae* regaled itself on snowberry flowers in my garden on four successive days; no other wild *betulae* was seen, and very few *Thecla quereus*.

(To be concluded.)

AN OLD TIME ENTOMOLOGICAL ARTIST—WILLIAM BUCKLER.

By S. G. CASTLE RUSSELL.

I am fortunate enough to possess a large number of figures of British lepidopterous larvae painted from life by the late William Buckler. Some time after their acquisition I showed them to Mr W. G. Sheldon, whose interest in entomological literature is well known, and who subsequently wrote to me as follows:—

"... I have learned some interesting particulars from Durant of Buckler's methods. It appears that he painted *from life* on the grey and white papers interleaved with Stainton's *Manual* all his larvae, and then from these on to sheets of white drawing paper, the drawings that the plates illustrating the work, *The Larvae of the British Butterflies and Moths* by William Buckler, were made from. You will see that your drawings are the original sketches."

The complete work, in 9 vols., was issued by the Ray Society in 1885 and the next few years. In addition to the drawings on the grey and white interleaves there are a large number on white drawing paper. The total number of drawings amounts to 3400, and are most beautifully and delicately executed, as might be expected from an artist who excelled in portrait and miniature painting. Occasionally, imagines after emergence are figured and these are equally beautiful. The colours appear to be as fresh as when first laid on. On the fly-leaf of the copy of Stainton's *Manual*, vol. 2, is the following inscription in the artist's own attractive writing:

"William Buckler. Lumley, 1859.

For thou, Lord, has made me glad through thy Works: and I will rejoice in giving praise for the operation of thy hands—Psalm, xc, 11."

Those who possess a copy of Buckler's *Larvae* will have read in Stainton's Preface that the artist commenced the figures in 1858 and continued until his death in 1884, during which time he executed over 6000 figures. As an entomological artist Buckler has never been excelled for accuracy and beauty of insect figures. The original paintings are, as might be expected, far superior to those reproduced on the plates in the work, and I have found them invaluable for identification purposes.

Only several figures of the Rhopalocera and Sphingidae are included in my collection, and it would be very desirable to learn if possible the whereabouts of the complete number illustrated in the work.

COLLECTING NOTES.

PLUSIA MONETA IN SCOTLAND.—When South's book was printed *P. moneta* had spread as far north as Cheshire. That must now be many years ago and possibly various records have been made of its travel northwards since that date; however, being out of touch and this *Plusia* being new to me, I felt that it might be of interest to note that while collecting in Stirlingshire up to 1925 no trace of *moneta* was found although most of the other *Plusias* were taken. Since transferring to Renfrewshire I took my first *moneta* at Delphinium flowers on the 7th August

1941. During 1942 several larvae were taken on *Delphinium* and these commenced pupating on 6th June and hatched from 30th June onwards. Wild specimens were also taken, all in July; the last being captured on the 31st.

During 1943 the case was much the same, small larvae at the black stage being taken on *Delphinium* from 28th April onwards. These commenced pupating 22nd May and emerged from 28th June onwards. The last wild specimen this year was taken on 27th July.

Delphiniums are reasonably plentiful in this district and so far I have only taken the larvae on this plant, although a few years ago when troubled with damage to the flowerheads of some Monkshood (*Aconitum*) I destroyed several small larvae which I took to be micros, but were probably *moneta* larvae in the first stages. Unfortunately the Monkshood has now been removed so that I have been unable to verify this as a food plant in this district.—ALAN M. MACLAURIN, Sulvenbeg, Kilmacolm, Renfrewshire, 26th October 1943.

APATELE (ACRONYCTA) ALNI, L., IN STAFFORDSHIRE.—I was fortunate enough to find a nearly full-fed larva of *A. alni* on 20th August 1943, in the village of Streetly, Staffs. It was crawling on the pavement in front of the few shops there and had evidently crossed the main road from some trees in Sutton Park on the other side. I noticed it and idly thought in my mind that it was a funny place to see a Cinnabar larva and thinking there was no ragwort near I looked back and saw the plumes on it and recognized the value of the find. It is still feeding on Birch and I am hoping it will not be parasitized. It is a fine example, with all the plumes perfect. Streetly is only nine miles from the centre of Birmingham.—P. SIVITER SMITH, Little Aston Park, Streetly, near Birmingham.

INFORMATION RE PETHER COLLECTION WANTED.—In two split sections I have acquired the "Coppers" out of the Pether Collection. They appear to have been split and partly disposed of haphazardly at various times. This has led to many of the labels, etc., becoming mixed, and in order to clean them up I am most anxious to locate the key to a series of numbers, one of which is attached to each specimen. I should be grateful for information as to the whereabouts of this key and the loan of it to extract the relevant data.

There are now many gaps in the series and if any of these specimens can be returned I shall be greatly obliged. In particular, since I have the ♂ Type of *alciphron* race *insignis*, Sag., I should like to get again the ♀ Type, as it would be better for them to be together. The ♂ type bears a red "Type" label.

These matters are required in connection with a closer study of the racial variation, etc., of the "Coppers" and for illustrations of the principal forms.—P. SIVITER SMITH, Little Aston Park, Streetly, near Birmingham.

OBITUARY.

Sir EDWARD B. POULTON, D.Sc., M.A., F.R.S., F.G.S., F.Z.S., F.R.E.S.

In the death of Sir Edward Bagnall Poulton the world has lost one of its greatest exponents of natural science, known far and wide for his advocacy of the theory of Evolution by Natural Selection as proclaimed in the writings of Charles Darwin and Alfred Russell Wallace. Born in January 1856 at Reading, his school life indicated his future by the persistency with which he followed his hobby of collecting natural objects in his spare hours. When the time came for transfer to the University he entered Jesus College, Oxford, as a scholar in Natural Science. After a general course in methods of scientific study he devoted himself to Zoology, with a special attraction for the Insecta. It was not long before his steady work was noticed, and after passing First Class in Natural Science, he was appointed demonstrator to the late Prof. Rolleston. A long series of articles in scientific magazines and Society publications soon made him known outside the walls of the University, especially so by his skill in marshalling his facts and pointing out their effectual support of the then new ideas on the Origin of Species. The result of this was that in 1889, at the early age of 34, he was elected a Fellow of the greatest British association of scientists, the Royal Society. The following year Poulton's fine work, the *Colours of Animals*, was issued. Three years later (1893) the Hope professorship became vacant by the death of Prof. Westwood and Poulton was elected to the post, which he held for 40 years until 1933, when he retired.

Of a very kindly nature, Poulton was always ready to help Associations to promote an interest in the observation and consideration of living things. For many years the writer "sat at his feet," as it were, at the meetings of the Entomological Society of London (now the Royal E.S.), from which meetings the professor was rarely absent, but always when present had interesting objects to exhibit and discuss. Pupils, who came under his influence at the University, subsequently furnished much biological matter of interest to us all. Many, carried abroad with them the spirit of observation of the things around them, and through Poulton's hands their records grace the pages of numerous Societies' publications: Resemblances among animals not closely related, Resemblance of animals to other natural objects, animate or inanimate, animal tactics in avoiding danger and seeking concealment, warning colours, all had his attention and were subjects for continual discussion. Other more difficult problems were of late his study especially of the "Germ Plasm" of Weismann, "Mutation versus Small Variations," of de Vries, the Inheritance of Acquired Characters, etc.

For some years he was one of the eight members of the Entomological Club, and it was a great pleasure of life to be a guest at his annual supper at Jesus College.

Honours came to him from various Societies both at home and abroad; he had served as President of the Linnean Society, the International Congress of Entomology, the British Association, and the Royal Entomological Society, of which he had been elected as Honorary Life-President. He was Honorary member of the well-known S. London Entomological and Natural History Society. Meetings in France, Switzerland, S. Africa, etc., he had also attended. The final honour was the well-deserved knighthood in 1935.—HY. J. T.

men and the hindwing are similarly white, and somewhat brownish tinged. The feathered antennae are of a red-brown colour." Erlangen, Germany.

Wernebrg, *Beitr.*, says that this is *lutulenta*.

It seems a considerable stretch of imagination to consider this description as one of *lutulenta*, nor is the figure any assistance. Were the determination evidently certain, this would be the first detailed description, and the name *melaleuca* of Esper might supplant the name *lutulenta* of Bork. in the absence of an adequate description by the latter author.

electrica, Fb., *Ent. Sys. em.*, III (2), 46 (1794).-

ORIG. DESCIP.—“*Laevis alis deflexis griseis: strigis duabus undatis apicis nigris. Rustica media. Caput et thorax grisea, immaculata. Abdomen pallidius. Alae anticae griseae, obscurae, in medio maculis duabus ordinariis, anteriore parva, orbiculata, posteriori reniformi, majori. Versus apicem strigae duae valde undatae, nigrae. Margo ciliis cinereis fuscisque. Alae posticae uti omnes subtus albae, immaculatae.*” Habitat Kiliae.

Wernebrg, *Beitr.*, I, 520, says, “Undoubtedly a variety of *euphorbiae*, Tr.” No one else seems to have noted it for *euphorbiae*.

fuscus, Haw., *Lep. Brit.*, 204 (1809) = p. 119 (*Bomb.*) (1803), *fuscus*.

ORIG. DESCIP.—“*Alis nigris, fascia triangulari media, strigaeque postica nigro-rufis obsoletissimis.*”

“*Alae anticae nigrae, fascia media certo situ solo conspicua, valde angulata, nigro-rufa, ad marginem tenuiorem valde attenuata; in qua stigmata ordinaria vix conspicua; anterieus fuscum ovale antrorsum inclinans; exterius rectum reniforme fuscum, ad latus interius nigrum. Striga postica repanda nigro-rufa fere oblitterata. Alae posticae albae immaculatae.*”

Stephens said, *Ill.*, II, 110, “probably the *Noctua lutulenta*, Hb.”

ab. *orthostigma*, Steph., *Ill.*, II, 110 (1829).

ORIG. DESCIP.—“Female, with the stigmata rather flavescent and distinct, the anterior one rounded, the posterior straight anteriorly, and bounded on the hinder margin with a few whitish spots: the posterior wings very deep fuscous.”

ab. *pallida*, Calb., *Iris*, I, 237 (1888).

ORIG. DESCIP.—“Its forewings are pale yellow-brown, as well as the thorax and head. The disc of the forewing is either not darker or only a little darker, but a darker shading is very clearly seen which lies between the orbicular and reniform stigmata from the costa to the inner margin. The stigmata which divert the two transverse lines and the waved line are either obsolescent or they are somewhat paler yellow-brown than the colour of the wing, the reniform is sometimes yellowish marked. The abdomen is yellowish-grey as in the typical form. The hindwing of the male and its fringes are also yellowish, that of the female yellowish-brown, not grey as in the typical form. On the underside all which is grey in the typical form is yellowish, in the male always somewhat paler than in the female.”

Roman Compagna.

ab. *unicolor*, Burrows, *Ent. Record*, XI, 157 (1899).

ORIG. DESCRIP.—“As type, but all markings most obscure.” “The reddish or brownish-black of the type prevails, but there is scarcely a trace of transverse lines, central band or spots.” Essex.

ab. *cinerea*, Burrows, *l.c.*

ORIG. DESCRIP.—“Ashy-grey, with dark central band.” “With distinctly marked central band, making the stigmata more distinct.” Mucking, Essex. = *consimilis*, with a distinct band.

ab. *approximata*, Burrows, *l.c.*

ORIG. DESCRIP.—“The ♂s with a blackish-fuscon central band, with the outer and inner margins cinereous-grey of the same tint as ab. *cinerea*; the ♀s with the band marked off from the outer and basal areas by a pale margin on either side, but the outer and basal areas only a little paler than the central area.” = a *sed*i with much less contrast between band and rest of wing.

ab. *aterrima*, Wrnke., *Int. Ent. Zt.*, XX, 293 (1926).

ORIG. DESCRIP.—“A melanic form. The forewings of both sexes are unicolorous coal-black with bluish tinge. The normal emphasised black band, such as the var. *luneburgensis* has it, shines through. The thorax also is coal-black. The abdomen is appreciably darker than in the normal form. The hindwings of the ♂ are white but on the margin deeply blackened. The hindwings of the ♀ are intensely grey-black coloured and only at the base to about the inner third of the wing somewhat less strongly darkened; they thus appear far darker than in the normal form.” Bred. Hamburg.

ab. *brunnea*, Schaw., *Zts. Oestr. Ent. Ver.*, XIV, 106 (1929).

ORIG. DESCRIP.—“From Mostar. These are distinctly brown, one ♂ nut-brown. The forewings with the exception of the whitish praeapical costal-marginal streaks and the somewhat lighter brown stigmata (in one ♂ the reniform stigmata are whitish margined) are uniformly brown. In the lighter ♂ specimens a darker brown transverse band appears. The antennae and body are the same brown (not black-brown). The hindwings white with a trace of brown on the margin and in the suggestion of a central band, in the ♀ quite light brown. The underside whitish-brown. The central band on both wings indistinctly brown, discal spots visible (forewing stigma).

ab. *decolor*, Drdt., *Pal. Noct. Supp.*, III, 136 (1934).

FIG.—*l.c.*, plt. 17f.

ORIG. DESCRIP.—“ab. *brunnea*, Schaw., has a fulvous hue,” “is common around Rome where it often assumes an ochreous-yellow coloration.” “This latter form I designate *decolor*, f. nov.” [? syn. of ab. *pallida*. —E.A.C.]

CORRECTION.—Page (131). Correct lines 28 and 29 from word “description.” to and including the word “Irish” as follows:—

“Seitz figs. (called *luneburgensis*) agree with the average Scotch, Irish and Manx examples of this well characterized yet variable form or race, which some authors consider as *sed*i, Gn. But the name *albidilinea*, Tutt, the type specimens of which were from the Orkneys applies only to the extreme dark ground colour. Very pale lined examples.”

Epunda, Dup. [*Aporophyla*, Gn., used by most authors] *nigra*, Haw. (1809).

Tutt, *Brit. Noct.*, III, 59 (1892): Meyr., *Handb.*, 55 (1895): Barr., *Lep. Br. Is.*, IV, 178, plt. 146, 2 (1897): Stdgr., *Cat. IIIed.*, 178 (1901): Splr., *Schmett. Eur.*, I, 199, plt. 38, 11 (1905): Hamp., *Lep. Phal.*, V, 238, fig. (1906): South, *M.B.I.*, I, 283, plt. 137, 8 (1907): Warr.-Stz., *Pal. Noct.*, III, 124, plt. 30d, e (1910): Culot, *N. et G.*, I (1), 178, plt. 33, f. 3 (1913): Meyr., *Rev. Handb.*, 117 (1928).

Ernst & Engram., *Pap. d'Eur.*, VII, 65, f. 455a, b, c (1790). These figures appear to be the insect we knew as *nigra*. Wernb., *Beitr.*, II, 118, said *nigra*, Haw., without remark. These figures are quite good.

Hb. *Samml. Noct.*, f. 538 (1809-13), gave a figure which he called *nigricans* and generally recognized as *nigra* although it is none too black and the marginal area shows too plainly the rufous shade; the hindwings are not good. The figure 861 of Hb.-Gey. (1834-40) is too brown, and too heavy in build; labelled *aethiops*. Neither is good, and both doubtful. But 709 *nigricans* has a uniform red tinge.

Treit., *Schmett.*, V (1), 184 (1825), said it was the *nigricans*, Hb.

Frr., *N. Beitr.*, II, 89, plt. 147, 2-3 (1836), gave fair figures of *aethiops*, Tr. = Hb., *Noct.*, 538, 709, ? *nigricans*.

H.-S., *Sys. Bearb.*, treated this species under the name *aethiops*, Vol. II, 270 (1850). He discussed the figs. of Hb. which might be this species, at considerable length, and said that the fig. 147, 2-3, *aethiops*, Frr., was more recognizable than all Hübner's figs. "221 Hb. Shape of forewing wrong, I never saw the orbicular white marked; 538 Hb. *nigricans*, ♂, wholly aberrant, marginal line much too straight, reniform too little indicated; marginal band of hindwing too strong; 709 ♀ better, forewing somewhat too short, the marking of the reniform not characteristic, the outer half of the fringes of the hindwings too dark; 859 ♂ forewing too narrow behind; 860 ♀, the whole appearance and the want of marking of the reniform are very doubtful; the same with fig. 861 given as *aethiops*, but which I am doubtful may not be *abjecta*."

Guen., *Hist. Nat.*, VI, 47 (1852). He said that this species was *nigricans*, Hb., 538 ? [709]; *aethiops*, Ochs. & Tr. He referred to Engram., 455a-c.

Barrett, *l.c.*, plt. 166, gave two very good figures.

Stdgr., *Cat.*, IIIed., 178 (1901), dealt with two syns., *aethiops*, Ochs., and *nigricans*, Hb.

Splr., *Schm. Eur.*, I, 199, plt. 38, 11 (1905), gave a figure somewhat too large and not black enough.

Hamp., *Lep. Phal.*, V, 238, fig. 77 (1906), gave only the deep black form *seileri*, although he gave *aethiops*, Hb., and *nigricans*, Hb., as synonyms. His figure is very poor.

Warr.-Stz., *Pal. Noct.*, III, 124 (1910), gave four good figs., plt. 30d, e, three of *nigra*, Haw., and ab. *seileri*, Fuchs. The synonyms given were *aethiops*, Ochs., and *nigricans*, Hb. nec L.

Culot, *N. et G.*, I (1), 178, plt. 33, f. 3 (1913), gave an excellent figure.

South, *M.B.I.*, I, 238, plt. 137, 8, gave an excellent figure of the all black form, *seileri*, Fuchs.

Barrett remarked on the Variation:

Hardly variable, except that in the North the reddish-brown dusting of the forewings disappears and they become wholly black, except the yellow of the outer margin of the reniform stigma, and in some instances even this is curtailed or nearly obliterated. Specimens sent from Carlisle by Mr G. B. Routledge are of a deep glossy black.

The Forms and Names to be considered:

nigra, Haw. (1806), *Lep. Brit.*, 192.

nigricans, Hb. (1809-13), *Samml. Noct.*, f. 538. Syn.

aethiops, Och. & Treit. (1816-25), *Schmett.*, V (1), 184. Syn.

ab. *seileri*, Fuchs. (1901), *Stett. e. Zeitg.*, XII, 128.

ssp. *dipsalea*, Wilts. (1941), *Jr. Bomb. N.H. Soc.*, XLII, 837.

Tutt dealt with the typical form only.

ab. *seileri*, Fuchs., *Stett. e. Zeitg.*, XII, 128 (1901).

ORIG. DESCIP.—“Forewings uniformly even deep black, without coppery sheen, with richer and deeper black marking. Almost blue-black, and when one holds the insect obliquely the richer deeper black markings stand out from the ground more distinctly than in the Dalmatian form.”

ssp. *dipsalea*, Wilts., *Jr. Bomb. N.H.S.*, XLII, 837 (1941).

ORIG. DESCIP.—“This remarkable desert form (perhaps also occurring in the Zagros hills) differs from the typical by its lighter ‘drier’ coloration. Forewing above: pale wood-brown, with a somewhat obfuscated median area, and a narrow dark grey marginal shade, approaching which the nervure becomes dark grey also. Lines, clear, outlined in sooty-brown. Orbicular with grey centre and pale outline; reniform, similar, the discal outline being whitish. Fringe smoky-grey with lighter brown interrupted at the nervures. Underside, greyish-white with a pale coppery glint; nervures and post- and ante-median lines distinctly outlined in faint brown; reniform darker brown; fringes darker brown. Hindwing ♂ white, with nervures marked in pale brown and margin in rather darker brown.” Mesopotamia, Naft-i-Shah.

“The distinctly brownish race found in the Lebanon seems to be an intermediate between the normal and the desert forms and is larger than *dipsalea*.”

Miselia (Hb., *Tent.*, 1806) (Treit., *Schm.*, 1825) (Steph., *Ill.*, 1829), most authors [*Meganephria*, Hb. (1820), Hamp., Warr.-Stz., Draudt-Stz.: *Allophytes*, Tams. (1942)] *oxyacanthae*, L.

NOTE.—*Miselia*, Hb., and *Meganephria*, Hb., are genera which are said to be impossible for *oxyacanthae*. (See *Ent.*, 75, 209).

Tutt, *Brit. Noct.*, III, 61 (1892): Meyr., *Handb.*, 56 (1895): Barr., *Lep. Br. Is.*, IV, 325, plt. 172, 2 (1897): Stdgr., *Cat.*, IIIed., 181 (1901): Splr., *Schm. Eur.*, I, 204, plt. 39, 9 (1905): Hamp., *Lep. Phal.*, VI, 306, fig. 107 (1906): South, *M.B.I.*, I, 289, plt. 131, 2-3 (1907): Warr.-Stz., *Pal. Noct.*, III, 129, plt., 31g, h (1910): Culot, *N. et G.*, I (1), 191, plt. 35, 5-6 (1913): Meyr., *Rev. Handb.*, 125 (1928).

Rosel, *Ins. Belust.*, I, plt. 33, 1-6 (1746?), gave two very fair figures, of which the ground colour is very much too dark, almost black.

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PARNASSIUS APOLLO, RACE KOSSWEGI, DE LATTIN.

By MALCOLM BURR, D.Sc., F.R.E.S.

During the last week in August 1943 I had the good luck to spend a week at the top of Uludagh, better known to English readers as the Bithynian Mt. Olympus.

Like most isolated peaks, it has a characteristic fauna and flora, which has been fairly well investigated. Among its specialities is *Parnassius apollo*, represented by a special race discovered in 1938 by Professor Kosswig, of Istanbul University, and described, on a pair supplied by him, by de Lattin in the *Zeitschrift des Wiener Entomologen Vereins*, 36 Jahrg., 1941, pp. 145-148, with sketch map and Plate XI. The race is named after its discoverer, *P. apollo*, r. *kosswigi*, de Lattin.

As this paper is inaccessible to British readers, it is, I think, worth while reproducing the description, together with the author's remarks.

It flies above the forest zone, that is approximately above 2000 metres, from the end of July. It was still strong on the wing in the last week of August, when I found one pair *in copula*. I caught several specimens, which I forwarded to the British Museum, and one or two to Mr Wheeler.

To the non-lepidopterist the interesting feature about this race is its relation with the neighbouring races. de Lattin's sketch map shows eleven races known from Anatolia, each confined to a small area. They are as follows:—

1. race *peroneurus*, Bryk., from Amasia.
2. race *kosswigi*, de Lattin, from Uludagh.
3. race *paphlagonicus*, B.E., from Paphlagonia.
4. race *tirabzonus*, Shelj., from Trebizond.
5. race *anatolica*, Pag., from Sultan Dagh.
6. race *tauricus*, B.E., from Pisidia and Pamphylia.
7. race *auerspergi*, Rbl., from Cilician Taurus.
8. race *levantinus*, Rbl., from Aintab.
9. race *zaraethrustrae*, Bryk., from Malatia.
10. *kashtshenkoi*, Shelj., from Ararat.
11. *dubius*, Bryk., from Kagysman.

de Lattin observes that *kosswigi*, which is the most westerly, approaches the Greek forms rather than its Anatolian more eastern relatives. This interested me, as at least one of the Orthoptera from the top of the mountain is also closely related to a Balkan species.

(To be completed.)

13,820



BUTTERFLY COLLECTING IN WOOD WALTON, HUNTS, AREA DURING 1943.

By H. A. LEEDS.

(Concluded from p. 37.)

Three broods of *phlaeas* appeared, and on 20th May an example of Homoeosis was taken consisting of an orange streak extending inwardly from an enlarged sixth submedian spot on the underside right hindwing of a female. The second brood yielded a nice female upperside, pallidula-major on 29th July; this brood was worn out by 16th August. The third brood was noticed on 9th September, and continued until 7th October. Two unusual features of this third brood are worthy of record. One concerns the almost entire absence of variation and the other regarding the great preponderation of females.

Usually when a third, or fourth, brood is fairly numerous there is considerable difference in colour and markings, whilst among them the submedian spots of the forewings are found, not infrequently, to be elongated; here only one was found and this only weakly reached anti-transiens on a female underside; a female ab. *minor* just below 26 mm. was kept, and no other aberrations were noticed except for 5 or 6 of the common forms of *caerucuneata*.

Regarding the disparity of sexes, only fresh ones were counted and to avoid duplication no portion of my walks was counted a second time. The distance covered was four to five miles, mostly one route out and another home; the directions varied. September:—9th, 5 females, 1 male; 18th, 6 females; 22nd, 63 females, 3 males; 23rd, 23 females, 5 males; 24th, 14 females, 5 males; 25th, 21 females, 7 males; 27th, 25 females, 6 males; foggy and dull weather then ensued and the last sight of fresh *phlaeas* was 1 female and 1 male during a short burst of sunshine on 7th October. These total 158 females and 28 males, giving a percentage of about 18 males to each 100 females. The weather was not favourable for emergence from 9th September until 22nd, when bright sunshine followed a slight frost; a sharp frost had occurred the previous morning. The figures do not represent the total examined as they were only computed during my scouting expeditions in the afternoons. Several visits were made during mornings to the long flat strip, covered with ragwort flowers, by the side of the railway where, as three years ago, was the most abundant growth. The count of 22nd September was made by walking once along it, but the scarcity of males continued there and they had not occurred earlier.

The extraordinary abundance seen in the second brood of *megea* in 1942 only resulted in the males being rather more numerous in this year's spring brood; females were exceptionally scarce and at the height of their emergence I could only find 4 females, for research purposes, to send away alive on one day. On the two previous days during long walks only one was taken each time and consequently released. The second brood was limited but contained more females.

On 16th May 7 or 8 *cardui* were seen, a fresh one on 16th August and only one later. On 23rd July fresh *io* and *atalanta* appeared. Of the *Pieris*, *brassicae* was noticed on 12th April; *rapae*, 13th; and 3 *napi* along with several of the other two species on 14th. *E. cardamines* male on 17th. In the spring broods both *brassicae* and *rapae* were numerous

and green-stuffs then and later were much damaged by their larvae. The multiplying was gradual and although immigrants were reported on the East coast there was no sign that their influx reached here. When at Knebworth I saw a cloud of *brassicæ* coming in from the east, several years ago; hundreds were dropping exhausted on the fields and road. Desiring to know if they remained in the district a "v"-shaped piece was taken out of the forewings of a large number of males by the use of my forceps, many of these were seen in the Knebworth gardens for several days afterwards. As they were met some half-mile on the eastern side of the village, their flight after recovery was still westwards until finding sustenance, and immigrant females, in the gardens both sexes remained. No females were marked as it seemed best to trample on as many as possible, although it had no material effect as cabbages in the gardens and fields were ultimately ruined.

Five *icarus* commenced on 22nd May, but continued scarce, the most seen being about 50 on 31st; some of the second brood were flying from 21st July to the end of September; the numbers were moderate here, but I learned they were more plentiful at Alconbury and Abbots Ripton. I took a few aberrations including male uppersides:—caeruleo, pure blue; ultralavendula, dark purplish-blue; and a thinly scaled pallidula-lavendula-suffusa. A male underside antibiirregularia with the right forewing darker grey than the opposite wing. Female undersides:—glomerata-arcuata; and an antiradiata with all submedian spots well extending outwardly, the second and twin spots joining the chevrons on both forewings.

Aricia agestis (*medon*) in both broods was more plentiful than for some years, but poor in variation. Two or three *argiolus* occurred in April. Only 2 male *aegeria* were seen. *Argynnis euphrosyne*, *aglaia*, *cydippe* and *paphia* were very limited. Of the Skippers, *tages* and *malvae* were scarce, *sylvestris*, *lineola* and *venata* (*sylvanus*) plentiful.

Several typical *croceus* were noticed from 25th July until 24th September. On 6th July *tithonus* was out in fair numbers. This species produced nothing worth mention, and even additional spottings were scarce and slight. The latter remark can also be applied to *jurtina*; 2 males appeared on 7th June and several the next day. Bleached forms were almost absent only 4 being noticed and two retained, viz., a male *post-transformis* and a female *antidex-transformis*; both were uppersides. No *semele* or *lucina* could be found. Hibernated or fresh *rhamni* were conspicuous on almost any sunny day. Very few *pamphilus* were out during May, after which they were so scarce that not more than about six appeared on any one day; a male underside, taken 6th August, had very distinct additional ocellated spots consisting of the fifth spot on right forewing and the rare 5th and 6th spots on left forewing; another on 9th September was extensively dark brown and black on the front wings underside. Mr G. E. Hyde of Doncaster has told me that he had seen hardly any *pamphilus* when collecting this year in Yorkshire.

This season is the earliest since 1933; in that year the large horse chestnut trees on "The Green" were in full blossom on 16th April, three days earlier than this year, and data for the insects then continued somewhat earlier as compared with 1943.

All the aberrational terms used are from the *Monograph of coridon*, Bright & Leeds.

COLLECTING NOTES.

SHORT articles and collecting notes are urgently wanted. Our space is limited and longer articles can be entertained only when convenient to be split into two or more definite portions.

MONTGOMERYSHIRE NOTES.—(Continued from page 22.)—July was consistently poor, both entomologically and meteorologically. Sugar on the 1st and 2nd produced only *T. pronuba* (in plenty), *A. exclamatoris*, *A. secalis*, *D. brunnea*, *A. monoglypha*, *A. rurea*, *P. nebulosa*, *A. psi*, *L. lithargyria*, *E. lucipara*, *P. strigilis*, and *M. brassicae*. Next day I found *O. atrata* at about 1290 feet towards the Merioneth border and at sugar I took—to my surprise—a worn *A. lucernea* and a *C. morpheus*. There was nothing doing till the 9th, when two hours' searching of birches yielded only five "Prominents'" eggs. On the afternoon of the 15th a ♀ *L. callunae* emerged in my cages, her subsequent matrimonial adventures providing both interest and precisely 200 eggs. The mate she selected, when she deigned to "call" on the 19th (she would have nothing to do with the first male she attracted) paired with her on my sleeve, his bright little eyes twinkling up at me all the time. They paired at 3.7 p.m. and by 5.55 p.m. the female had already laid 17 eggs. As usual with this genus, copulation was very brief. The female laid all her ova that night, and when I opened her abdomen two days later it was empty of eggs. These ova hatched during the 16th and 17th August.

A female *O. margaritata* and a male *M. maura* completed the record from 9th to 15th July, save for four ova of *L. capucina* (*camelina*) on birch. *A. sylvestris* and *S. semele* were first seen on the 17th and on the next day *O. chenopodiata* (*limitata*). The first *M. tithonus* was noted on the 20th. *A. paphia* appeared on the 22nd, and then came a series of blank days (chiefly owing to rain) till the 27th, when I found a larva of *T. duplaris* and more "Prominents'" eggs, mostly *dromedarius* and *capucina*. Altogether a dreadful month.

August was equally bad. On the 2nd I found a larva of *D. trimaculata* in its last instar—it was climbing up a beech, having presumably been washed off a neighbouring oak by torrential rain the previous day. On a fence was *H. furcata*. Next day I collected from oak larvae of *D. pudibunda*, *B. prasinana*, *S. bilunaria* (*illunaria*) and one exactly like a *Plusia* but with ten abdominal feet. This was "a new one on me." A fresh brood of *P. megera* began to appear. During the succeeding days I searched birches without any success at all—how different from previous years!—and the only newcomers to sugar were *A. pyramidea* and *C. trapezina*. On the 10th a third stadium *L. populi* occurred on *Salix cinerea*, L., and a few larvae of *T. or* on the only clump of aspens for miles. A very lovely form of *Hepialus fuscinebulosa* (*velleda*) was brought to me from the hills (at about 1300 feet) on the Merioneth border.

A newcomer on 12th August was *Eupithecia icterata* (*subfulvata*), and on the 17th I found a full-grown *A. leporina* (green form) on birch, together with a third instar *D. lacertinaria*. Sugar throughout the month brought nothing new except *D. dahlii*. On the 23rd a young *N. ziczac* was noted on *Salix cinerea*. *Polia* (which we must now call

Antitype) *chi*, so abundant here in 1941, was represented by a solitary male resting on a stone wall on the 30th. *P. meticolosa* appeared at sugar the same evening and continued throughout September.

September was even worse than August. The solitary larva of *P. gnoma* (*dictaeoides*) found on the 8th proved to be ichneumonid, and oaks yielded only *B. prasinana* and *D. pudibunda*. On birch I found, also on the 8th, a half-grown *C. coryli*. From the 9th to the 15th it rained incessantly, the Severn valley becoming a lake. *C. pisi* (the common striped form), full fed, obligingly started to cross a road as I approached it, and from the 18th to the 22nd there was such a torrential downpour that many larvae must have been destroyed. All I could find during a lull (at the cost of coat sleeves wet to the elbow) were a full-fed *T. fluctuosa*, a half-grown *L. capucina*, and two small Geometers. However, on the 21st, all foliage being still sodden, I found, on a small bush of *Salix cinerea*, three young larvae of *P. palpina* on the south side, two on the east, and one on the north. Five duly pupated, the sixth being overtaken by the time-lag. At sugar during the remainder of the month I took only *A. litura* and *A. lychnidis*.

On 7th October I boxed a ♀ *O. autumnata* found on an oak trunk and on the 9th a boy brought me a *D. pudibunda* which spun up in its matchbox by the time it reached me. It was kept in my study and the female moth emerged on 17th December at 11 p.m. G.M.T. precisely. On the 14th I dug oaks and found a ♀ *Notodonta anceps* (*trepida*), six *D. trimacula*, and four *B. prasinana*—the last being, as usual, spun up on dead leaves collected in crannies at the roots. Do the larvae crawl down the trunk and spin up on leaves in these crannies, or do they pupate on growing leaves, the leaves falling to the ground in due course and being blown into the crannies by the wind? "Some says one thing, some says another": behaviour in a cage (where, this last year, some of my larvae of this species spun up on green leaves growing on the twig and some on dead leaves on the floor of the cage) is no criterion. Ivy bloom on the 28th yielded only a worn *C. icteritia*, several *C. vaccinii* and a good many *C. ligula*.

Asteroscopus sphinx appeared on 3rd November, and on the 4th *V. io* and *Plusia gamma* were seen flying in the sunshine. On the 11th I boxed a ♂ *C. pennaria* from an oak. Thus ended one of the very worst years' entomologising I have ever known.—P. B. M. ALLAN.

BREEDING EXPERIENCE WITH ARCTIA CAJA.—In 1936 I obtained a batch of eggs from a normal *A. caja* ♀ taken in the Epping Forest area. These ova produced one abnormal insect, a ♀ with the white markings on the forewings nearly absent and the orange hindwings heavily patched and dotted with black.

This insect was not used for breeding, but the stock was carried on by several pairings among the rest of the brood, the larvae being sleeved out for hibernation and the insects kept to their normal calendar.

In 1941 a ♂ of this form appeared. Unfortunately, I was away and on returning found this insect in a cage with another ♂ and two ♀♀, all normal, all four insects having the same parents. There were several batches of fertile eggs in the cage, but none of them reproduced this form in this or the subsequent inbred generation.

In other batches from the same pure stock in 1941 there appeared an aberration with the hindwings more or less suffused with smoky scales. A pair of these produced ova, from which were bred about 25% of a totally suffused form, identified by Dr Cockayne as ab. *fumosa*, Hörhammer, in 1942, with a few slightly suffused as to hindwings only and a majority of typical specimens.

Pairings were obtained in 1942 of *fumosa* × *fumosa*, and of each sex of *fumosa* with smoky hindwinged and typical insects, all the direct progeny of the original ♀. The stock was getting weak and *fumosa* × *fumosa* laid no eggs. Many of the others were infertile, and finally an infectious disease destroyed the whole stock in 1943 after a very successful hibernation. I had 2000 larvae in 1942 and gave away or liberated about half of them, and from the rest I bred one crippled typical ♀. However, Mr E. J. Hare had a small emergence of typical insects from this stock and obtained fertile ova, some of which he returned to me. I have also a small number of larvae from eggs found in my garden, which are likely to be of the same stock. If any of these come to maturity they will constitute an eighth generation without the introduction of fresh blood.—H. DOUGLAS SMART, F.R.E.S., 26 Snake's Lane, Woodford Green, Essex.

HAMEARIS LUCINA, L., IN THE NEW FOREST.—Adverting to Mr Allan's note in the February number of the "Record," I may say that Colonel Burkhardt saw a few of this species in the Brockenhurst district, and I also met with a few examples, but in no part of the Forest area were they plentiful so far as my own experience went. This species appears to be exceptionally liable to fluctuation in numbers. In some seasons they are plentiful; in others scarce. With regard to *Apatura iris*, this insect has for many years past been conspicuous for its absence in the Forest, although odd specimens have occasionally been reported. A similar period of scarcity existed in the 70's when *iris* was not seen for some 14 years, after which it became quite plentiful again. Probably it will in course of time again grace the Forest with its imperial presence, together with that fine and handsome butterfly, *Nymphalis polychloros*, L., which at one time was so plentiful in the Forest. A few odd specimens were seen during last season. The absence of this beautiful insect is much to be deplored; *iris* has in recent years been plentiful in certain districts away from the Forest area but not very far, and it may spread from there to its old haunts.—S. G. CASTLE RUSSELL.

SYMPHOROMYIA IMMACULATA, FAB. (DIPTERA-LEPTIDAE) IN N. KENT.—According to Verrall in *Brit. Flies*, Vol. 5 (1909) the distribution of this fly is not so generally known as that of the more northern species *S. crassicornis*, Pz., and the only localities he gives are Seaford in Sussex, Felden in Herts (both in June), and a reference in Walker to Darenth in Kent. I have taken *S. immaculata* on chalk downs at Farningham and Eynsford (June), and All Hallows-on-Sea, Thames Marshes (July). All my specimens were taken by sweeping grassy herbage. *S. immaculata* is one of the smaller British *Leptidae* and not very typical; at first glance it resembles a small grey *Anthomyid* or *Acalyptrate* rather than a *Leptid*, and not until one looks more closely at the head,

and the wing venation, is its true character observable.—H. W. ANDREWS.

HEODES (LYCAENA) PHILAEAS, L.: THIRD EMERGENCE.—With reference to the Note on this subject in the *Ent. Record*, January 1944, by Mr F. V. L. Jarvis, I am accustomed to seeing "Small Coppers" in September and October on fine days in this S.E. Sussex area. I noted their occurrence on 11th October 1942, 24th September and 9th-10th October 1943, but not as anything unusual.—RICHMOND WHEELER, Ph.D., Grantchester, Chynton Road, Seaford.

A HEAT EXPERIMENT WITH AN UNEXPECTED RESULT.—On 4th September 1943, at Maidencombe, I took a female *Caradrina ambigua*, worn and quite typical; before releasing next morning I found she had laid forty eggs. These hatched on 16th September. I immediately placed the larvae in an incubator at a temperature of 90° Fahrenheit. The larvae fed and grew at an incredible speed and the first pupated in 23 days on 9th October; they all pupated by 13th October. I left the pupae in the incubator still at 90°, and the first moth emerged ten days later on 23rd October; all emerged by 30th October. This makes 37 days from day of hatching to day of emergence—surely a record! [In India the allied *Laphygma exigua* has been noted to complete a life-cycle in three weeks under natural conditions.—T. B. F.]

Now, according to theory, judged by heat experiments on species such as *Leucania vitellina*, one would have expected the moths to be much paler in colour than the original parent, but not so in this case. The whole brood (30 in all emerged) are really dark olive tone, exactly the same colour as *Zenobia retusa*.—A. RUSSELL JAMES, "Braemar," Morgan Crescent, Theydon Bois, Essex.

THE TAXONOMIC VALUE OF GENITAL ARMATURE IN LEPIDOPTERA.—

1. Investigation of the organs of copulation, chiefly of the male organs so far, has given a new impetus to systematic Lepidopterology.

2. The great value of this method of investigation is in general indisputable.

3. It is, however, not possible to use it for all families as a generally valid method of determination, as has been attempted. In particular, the axiom that closely-related species as a rule have very great differences in their genital armature is incorrect.

4. The taxonomic value of the male genital armature has, on the contrary, been shown by recent investigations to be uneven in the different Lepidopterous families, and is small in some butterfly genera. It has proved especially great in the Noctuids and Geometrids so far investigated, and is, as a rule, of real and often decisive import in separating the species of these families.

5. Differences in genital armature do not always imply a specific difference. The geographical variation in the genital armature of a species can be considerable, and requires particular caution.

The above is my translation of Warnecke's conclusions in his paper, "On the taxonomic significance of the Genital Armature of Lepidoptera" (*Verhandlungen VII. Internat. Kongress für Entomologie in*

Berlin, 1938, I Band, 1939, S. 463-481, 28 Illustrations).—E. P. WILTSHIRE.

“ ASSEMBLING ” IN INDIA.—“ Assembling ” is not, in my experience, a very productive method of collecting in India. It is, of course, possible that my females were exposed at unsuitable times, but in most cases males do fly at the hours when the females were exposed. I have had them coming to light at these times, and even if they came after I had gone to bed it is more than likely that some would have been found the following morning in the verandah where the females were exposed, as moths that have been attracted to light often remain settled on the ceiling until the next day.

All my records refer to Calcutta, but a friend of mine told me that he had tried assembling in Shillong with *Actias selene*, Hbn., and *Philo-samia cynthia*, Drury (both Saturniidae), and that it had been a complete failure.

Taragama siva, Lef. (*Lasiocampidae*).—A single female emerged between 8 and 9 p.m. on 1.iv.39. The first night she attracted nothing, but laid a few eggs, which were infertile. Called on the evening of the 2nd between 9 and 10 p.m. and attracted eight males. One male was put in the cage with her and paired immediately, remaining *in cop.* for about an hour. Immediately after separating she commenced to lay and laid about 230 eggs that night; the following night she laid about 30 and died the next night.

Trabala vishnu, Lef. (*Lasiocampidae*).—A female emerged during the night 1-2.v.39 and was exposed from the evening of the 2nd, but did not appear to call, nor was it found to be calling at various times during the night. She was found to be calling at 5.30 a.m. on the 3rd and continued till 8.30 a.m. but without attracting anything. On the night of the 3rd she began calling at 6 p.m.; and a second female, which had emerged the previous night, was calling at 11 p.m. Both were still calling the following morning; no males were attracted and two males, which had emerged at 7.30 p.m., had not moved from their original position at 11 p.m., when they were killed. No males were attracted during the evening of the 4th, and by the morning the first female had begun to lay. On the evening of the 5th, the first female did not call and no males were attracted by the second female.

Lymantria nigra, Moore (*Lymantriidae*).—Two females emerged in the afternoon of 21.xi.42 and soon started calling. They were kept under observation all the evening and looked at at intervals through the night, but no males were attracted. A third female emerged on the 22nd, and all three were exposed that evening and night and again during the evening and night of the 23rd without result. They were killed on the morning of the 24th after infertile eggs had been laid. Another female emerged on the 25th and was exposed on the 26th and 27th, again without result. It is possible that the males are attracted during daylight, as a wild pair were found *in cop.* at about 5.30 p.m., the female still clinging to its cocoon. The female is a common visitor to light, the male a very rare one.

Lymantria ampla, Wlk. (*Lymantriidae*).—A female emerged during the afternoon of 4.xii.41 and laid a number of eggs during the night.

A second female emerged during the morning of 5.xii.41, the first female calling from early that morning and the second starting about mid-day. Only one male was attracted. Both females laid more eggs during the night 5-6.xii.41. On the 6.xii.41 both females were again exposed and at about mid-day three males appeared. A paper cover was then put over the females and the males flew away. An hour later the paper cover was removed and two more males were attracted; one male was actually found resting close to one of the females and had evidently mated as eggs laid subsequently were fertile. No males were attracted that afternoon. More eggs were laid during the night 6-7.xii.41, and the following morning both females were again exposed and were seen to be calling. A number of males were attracted during the morning and the first female was again allowed to mate. Eggs were again deposited during the night, and on the 8.xii.41 one male only was attracted. Both females failed to call on the 9.xii.41. The first female died on the 13.xii.41, and the second female the day following. The first female laid very few eggs after the second mating. This species has a wingless female and a day-flying male. This is the only case I have of a female calling and attracting males after she had already mated.

Perina nuda, Wlk. (*Lymntriidae*).—A female emerged during the morning of the 31.viii.35. She was exposed the following morning but only attracted a few males. She was again exposed during the next four mornings and proved rather more attractive. During the night 5-6.ix.35 ten ova were laid and next morning no males were attracted. A male was subsequently caught and put into her box and copulation took place immediately. Calling was not observed at any time. This species has a female flying at night and attracted to light and a male flying in the early morning.

Parasa lepida, Cr. (*Limacodidae*).—Four freshly-emerged females were exposed from 6 to 10 p.m. on the 15.viii.36, but not a single male was attracted. This is the usual flight period and males frequently come to light at this time.—D. G. SEVASTOPULO, F.R.E.S., Calcutta, 12.xii.43.

SUBSTITUTE FOODPLANTS: A NOTE.—With reference to Mr Allan's article on p. 5, *Ent. Rec.*, January 1944, by "associated evolution of insect and plant" I meant the parallel evolution of insects and flowering plants with about the same degree of interdependence as can be observed between them to-day, or perhaps with a rather weaker interdependence in the early stages of the evolution. No "new theory of evolution" was intended thereby. From Mr Allan's replies on p. 6 it would appear that, as I suspected, the genus *Cionus* did not, in fact, originate before the genus *Verbascum*.—E. P. WILTSHIRE.

SYNTHYMIA FIXA, F., IN ENGLAND.—A male *Synthymia fixa*, F. (*monogramma*, Hbn.), in very fair condition, was taken at the Start light-house, S. Devon, in 1937 by A. W. Godfrey and handed to the late Sir Beckwith Whitehouse on 1st October. It is a pretty species with slender thorax and abdomen and orange hindwings, and is about the same size as *Ectypa glyphica*. It is a common Southern European species found in S. France, Spain, Portugal, Italy, Sicily, Malta, and Algeria, and

flies in May and June. The foodplant is *psoralea bituminosa*. This little Noctuid has been placed by some authors in the genus *Homopyralis* and the figure of *H. contracta*, Walk., in Holland's Moth book, plt. 30, gives a good idea of its appearance.—E. A. COCKAYNE, 16 Westbourne Street, W.2.

METILECTRA QUADRISIGNATA, WALK., IN ENGLAND.—A female was sold with a small British collection at Stevens Auction Rooms on 12th May 1931. The pupa was found on 13th March 1907 in a loose cocoon on the bark of a tree and the imago emerged on 16th May 1907. Unfortunately, the locality was not given. I am indebted to Mr W. H. T. Tams for identifying it. It is a common North American insect and, no doubt, the larva was imported accidentally.—E. A. COCKAYNE, 16 Westbourne Street, W.2.

There is a figure of *S. ficea* in Seitz *Pal. Noctuae*, III, p. 242, plt. 48i. It was described by Fabricius in 1794 in *Ent. Sys.*, III (2), p. 46. Stdgr. listed it, *Cat.*, III ed. (1901), p. 240, under the name *Metoptria monogramma* and placed it near our *Euclidia mi* and *E. glyphica*.—HY. J. T.

A NOTE ON *AGROTIS LUCERNEA*.—Since reading the article on *A. simulans* by Mr T. B.-Fletcher, p. 9, vol. lvi, I have collected the following facts about *A. lucerneae* from reliable sources. As these two species are very nearly related I thought it might be very interesting to compare their habits. A friend some years ago told me that he used to take *lucerneae* in July and then never saw it again until the autumn at ivy. The other day I paid my friend a visit and saw in his old diary two entries for *lucerneae* at ivy, 8th October, in different years. Another entry recorded, 22nd November 1901, that the larvae of *lucerneae* were just hatching. This was the same year as one date above, 8th October, at ivy. Another friend had a ♀ *lucerneae* given him in July, which he kept alive till October in 1942.—(Capt.) C. Q. PARSONS, Torquay.

[More dates re the appearances of both larvae and imagines, please.—HY. J. T.]

CURRENT NOTES.

WE have received from the Imperial Agricultural Bureau the combined Reports on the Parasitic Service, which have not been issued as is usual as supplements to the Annual Reports of the Executive for 1940-1 and 1942-3. The report is an interesting account of the various insects, which have shown themselves to be pests and of the means taken to counteract their attacks by the supply of parasitic insects known to be predatory on these pests. Much of this work has been transferred to America (Canada), hence the delay, but still much work has been set in motion. Under the Headings, Vegetable Crop Insects, Forest Insects, Deciduous Fruit Insects, Cereals and Foliage Crop Insects, Citrus Fruit Insects, Greenhouse Thrips, Stored Products, etc., the circumstances of each kind of crop are stated and the quantities of

the parasites used and where, when and how they are being applied. There is a summary under the various Contributing Units for what parasites have been specifically wanted, the quantities shipped and the Funds supplied, if any; many of the shipments going by air. In some cases a few parasites only are sent, in others thousands. The second part of the Report gives details of the collecting of the material for shipment, the Field Investigation, those employed in this work, and breeding and amassing the parasites, the laboratory technique and the preparation for packing, the packing and shipment details undertaken. Not only were parasites shipped but no less than 53,000 beneficial insects were also sent out to Canada and Australia from one centre in 1942-3.

THE Society for Brit. Entomology has recently published parts 6 and 7 of Vol. 8 of its *Transactions*, the issue for 1943. There are two memoirs (1) "A Contribution towards an Ecological Survey of the Aquatic and Semiaquatic Hemiptera (Water-bugs) of the British Isles, Anglesea, Caernarvon, and Merioneth," by E. S. Brown, B.A. (Oxon), F.R.E.S. (2) "The Water-bugs (Rhyncota-Hemiptera) of North Somerset," by G. A. Walton, M.B., Ch.B., F.R.E.S. The latter memoir has a large number of diagrams and sketches in illustration.

ENTOMOLOGICAL CLUB.—Should anyone who reads this notice have any snap-shots taken at meetings of the Entomological Club, or any Menus of past suppers to spare, if he will kindly let me have them the Club will be very much obliged.—HORACE DONISTHORPE, Hon. Secretary, Entomological Department, British Museum (Nat. Hist.), Cromwell Road, London; S.W.7.

THE SOUTH EASTERN NATURALIST AND ANTIQUARY for 1943 has just been issued and we must congratulate the Hon. Editor, Capt. T. Dannreuther, R.N., F.R.E.S., for the work he has done for the S. Eastern Union of Scientific Societies. The Annual contains an account of the Proceedings at the Congress of 1943 held at Reading. The work of the Union is divided into Sections: The Zoological Section, of which Mrs Winifred Boyd Watt is the Hon. Secretary, comprises the preparation of a Bird Report of S.E. England, the work of an Immigration Committee, and other zoological interests in the area. The Immigration of Insects is dealt with under this section by that most energetic leader, Capt. Dannreuther, a worker who never fails to register aught that occurs in his particular area. Let us hope that ere long the activities of the Union will not be curtailed by circumstances as at present.

PARTS I and II, *Revista Soc. Ent. Argentina*, 1943, are to hand. There are two Obituaries with portraits of well-known entomologists who have recently passed away. Dr Ernesto D. Dallas and Dr Carlos Bruch, both of whom have helped forward the study of *Entomology* in the Argentine for many years past. The President, Alberto Breyer, discusses the Pierid genus *Meganostoma* as represented in the Argentine and adds two new subspecies to *M. helena*, viz., ssp. *confluens* and ssp. *albescens*. Pablo Kohler discusses various new species and forms of Lepidoptera which have been added to the Argentine fauna more or less lately and figures three species. Fernando Bourquin makes Observations on the

Metamorphoses of *Syssphinx crispular*, and gives a series of figures of the different stages in the Life-history. The genus *Syssphinx* is strongly represented in S. America and until recently very little has been known of their economy. Some species are very attractive. Alberto Breyer has made a few notes on the species of *Castnia* found in the Argentine. Coleoptera, Diptera, and especially Orthoptera, etc., occupy much of the other space in these parts. Most contributions are well illustrated.

MR T. BAINBRIGGE FLETCHER often very kindly aids in the Synonymy of some of the Noctuid species I am working out. The paragraph below is a critical note on one of the new generic names presented to us a year or two ago, and shows that the change was quite unnecessary at least. This incident shows that before a new name is put forth, there should be a fairly long interval before it be brought into use, to give time to other systematists to discuss the case.

Meganephria, Hb., *Verz. bek. Schmett.*, p. 206, Coitus, No. 1 (1820): Type *oxyacanthae*, Linn. [N.B.—In *Tentamen* (1806) "*oxyacanthae*" was exponent of "*Stirps I. Miseliae*": in *Verz.* (p. 206) "*Stirps I. Miseliae*" contained No. 2069 "*Meganephria oxioacanthae*, Linn.," which Hübner had already indicated as the special exponent of this *Stirps* and therefore, *a fortiori*, of this Coitus (*Meganephria*) included in this *Stirps*]. = *Miselia*, Treits., *Schmett. Eur.*, v, i, 386 (1825) [contained *oxyacanthae*, already indicated as type of *Meganephria*]. [*Miselia*, Ochs., *Schmett. Eur.*, IV, 72 (1816) (*nondesc.*)]. [N.B.—Both Ochs. & Treits. quote (*Tentamen*) "*Miseliae*, Hb.," of which *oxyacanthae* was the sole exponent.] = *Allophyes*, Tams., 1942 [a quite unnecessary synonym].

ONE of the sectional compilers of Seitz Supplement, Bollow said in reference to the over naming of races of *Parnassius apollo*, especially from the Tyrol, "All these races will require to be thoroughly checked over by means of extensive material captured from a series of years. A few odd specimens are really not sufficient in order to establish a new race for each valley and village."

RACES are *not subspécies*, but are only colonies with a few wild examples of a particular aberration or form, perhaps not present every season. The confused use of these terms is another item to the "witness of science to linguistic anarchy," as so ably described forty years ago by Lady Welby's extracts from scientific periodicals.

Ernst & Engr., *Pap. d'Eur.*, VI, 81, figs. 328 (1788), gave two very good figures of *oxyacanthae*, Hb., 328d was a very variegated and blotched example, 328e was an average green-marked ordinary form.

Esper, *Abbild. Noct.*, IV, 543, plt. 160 (1790+?), gave two quite recognizable figures of *oxyacanthae*, L.

Hb., *Samml. Noct.*, 31 (1800-3), gave an excellent figure of the usual continental form. In his *Text*, p. 165, he said it was a ♀.

Dup., *Hist. Nat.*, VI, 374, plt. 91, 1 (1826), gave a good figure of a dark-ground typical form.

Wood, *Ind.*, 57, fig. 292 (1834), gave two very fair figures but the white character at the angle of the forewing does not show.

Millière, *Iconog.*, etc., III, 165, plt. 116, 6 (1870), gave an excellent figure of an extreme form of *oxyacanthae* sent him by Doubleday, under the name *capucina*.

Barrett, *l.c.*, plt. 172, gave three figures. 2a, a dark brown form with suppression of markings especially the green ones; 2b, a very dark brown *capucina* form, only the anal white curve being conspicuous.

Splr., *Schm. Eur.*, I, 104, plt. 39, 9 (1905), gave a very fair figure with only very slight green marking. He described a new form, *corsica*, and gave the forms previously described.

Hamp., *Lep. Phalaena*, VI, 306, fig. 98 (1906), recognized *capucina*, Mill., *benedictina*, Stdgr., and *asiatica*, Stdgr.

South, *M.B.L.*, I, 289, plt. 131, 2-3, gave two figures, one typical and the other form *capucina*. Both were quite good.

Warr.-Stz., *Pal. Noct.*, III, 129, plt. 31g, h (1910), gave six figures all fairly good but all on the dark side with the green more or less obliterated. ♂ and ♀ *oxyacanthae*, ♂ and ♀ *benedictina*, ♂ and ♀ *capucina*.

Culot, *N. et G.*, I (1), 191, plt. 35, 5-6 (1913), gave two figures, a very fair typical form and an excellent *capucina*.

Of the Variation Barrett remarked:

"In its ordinary typical form not very variable, but slightly so in the depth of its chocolate clouding, more so in the abundance or deficiency of the glistening green dusting on and near the nervures, which even in some pale examples is occasionally quite absent. But in a well-known and constantly recurrent melanic variety, known as var. *capucina* the ground colour is deep dark chocolate-brown, the markings all very secure except the white curved streak above the anal angle, which is always present and generally conspicuous; and there is little or no trace of the glistening green scales. This variety hardly appears to be united with the ordinary form by intermediates; it seems to occur rarely or sparingly with it everywhere, more commonly in the Midland counties, and in S. Yorkshire, Derbyshire and Shropshire appears to be quite as frequent as the typical insect. In the cabinet of the late Mr F. Bond is a strange aberration having the markings of the forewings almost obliterated by dashes of white, though the nervures are dark; in that of the late Mr H. Doubleday is a whitish-brown specimen without chocolate clouding, but shaded with pink, and possessing the dusting of glistening green, and also the usual lines and anal streak.

The Names and Forms to be considered:

oxyacanthae, Linn., *Sys. Nat.*, 10ed., 516 (1758), and *Fn. S.*, 319 (1761).

capucina, Mill., *Icon.*, III, 165, plt. 116, 6 (1870).

ab. *pallida*, Tutt, *Brit. Noct.*, III, 61 (1892)

ssp. *asiatica*, Stdgr., *Iris*, IV, 283 (1891).

r. *benedictina*, Stdgr., l.c.

r. *corsica*, Splr., *Schm. Eur.*, I, 204 (1905).

f. *fulva*, Roths., *Nov. Zool.*, XXI, 329 (1914). Sp.?

ab. *subcapucina*, nov. ab.

Tutt dealt with (1) the typical form, reddish-brown with bright green inner and outer margins. (2) The unicolorous reddish-brown, with green obsolete, *capucina*, Mill. (3) *pallida*, Tutt. Pale reddish-grey, narrow stripe of green on inner and outer margins.

var. *asiatica*, Stdgr., *Iris*, IV, 283 (1891).

ORIG. DESCRIP.—“I possess more or less typical *M. oxyacanthae* from Germany, Austria, England, France, Andalusia, Macedonia and Greece. Somewhat strikingly different from them are specimens which I have in large number from Amasia, and which were sent as var. *asiatica*. These are much lighter, grey, not brown like the typical European form, and they show on the forewings less greenish powdering. Also the hindwings are not brown-grey, but light white-grey, clouding somewhat darker to the outer margin. I place with this var. *asiatica* two somewhat different ♂s from the Amur (Suifun) which are equally light grey, but show no trace of greenish powdering on the forewings, on which the transverse lines, as well as the black longitudinal streak stands out sharper, the latter being somewhat longer.”

var. *benedictina*, Stdgr., *Iris*, IV, 284 (1891).

ORIG. DESCRIP.—“The specimens from Beirut form a great contrast to this var. *asiatica*, and I describe them as var. *benedictina*. These have much darker forewings than the typical forms almost without any trace of a greenish powdering: They come very near the var. *capucina*, Mill., from England, but have not a prevailing brown almost black-brown colour, but their dark (blackish-grey) forewings are only slightly brown-suffused. They have dusky, white-grey, instead of the dark brownish-black-grey hindwings of *capucina*, which on the outer half are powdered strongly with black. A few specimens which I obtained a short time ago from Herr Paulus from Jerusalem, stand almost midway between this var. *benedictina* and the var. *asiatica*, since they have somewhat darker forewings than the latter, yet their lighter hindwings seem to place them better with v. *asiatica*.”

r. *corsica*, Splr., *Schm. Eur.*, I, 204 (1905).

ORIG. DESCRIP.—“Paler, brighter yellow-reddish coloured.” Corsica.

subsp. *fulva*, Roths., *Nov. Zool.*, XXI, 329 (1914).

ORIG. DESCRIP.—“Differs from *oxyacanthae* in the ground colour being uniform cinnamon fulvous and all the markings almost obliterated.”

Draudt-Stz., *Pal. Noct. Supp.*, III, 163, placed this in the genus *Sidemia* and doubted its being a form of *oxyacanthae*. It was found in October in Algeria.

ab. *subcapucina*, nov. ab.

ORIG. DESCRIP.—I have to thank Rev. Walter L. Freer of Chute,

Surrey, for calling my attention to this form. "A dark chocolate form very similar to the illustration in South's Vol. I, plt. 141, f. 3." He says: "It does not seem to be so dark a form of *capucina* as I used to come across in the Midlands." Of a long series of this species (163) from many localities, I have one example taken at Mucking in Essex, of the dark chocolate ground without any of the usual black or black-brown marking.

Dichonia, Hb. (1821), Stdgr., Splr., Culot [*Diphthera*, Hb. (1809), in *Tent.*: Polia, Ochs. & Tr. (1816-25), Meyr., Meyr.: *Agriopis*, Hb. (1825), Dup., H.-S., Gn., Hamps., South, Warr.-Stz., Draudt-Stz.], *aprilina*, Linn. (1758).

Owing to the confusion of *aprilina* with *orion* (*alpina*) by early systematists most, if not all, of the above generic applications are misapplied. Recently Tams of the B.M. has proposed *Griposia* (1939) with *aprilina* as the type.

Tutt, *Brit. Noct.*, III, 62 (1892): Meyr., *Handbk.*, 54 (1896): Barr., *Lep. Br. Is.*, IV, 320, plt. 172, f. 1 (1897): Stdgr., *Cat.*, III ed., 182 (1901): Splr., *Schm. Eur.*, I, 205, plt. 39, 6 (1905): South, *M.B.I.*, I, 290, plt. 141, f. 1 (1907): Warr.-Stz., *Pal. Noct.*, III, 132, plt. 32d (1910): Culot, *N. et G.*, I (1), 192, plt. 35, 9-10 (1913): Meyr., *Rev. Handb.*, 132 (1928): Drdt., *Pal. Noct. Supp.*, III, 141, plt. 171 (1934).

Rosel, *Ins. Belust.*, III, 218, plt. 39, 4 (1746-?), gave a very fair figure but the festoon-like bands of the hindwings are a very remarkable embellishment.

Schiff., *Verz.*, 70, F. 1 (1775), gave this species under the name *runica*, which Hb. used.

Illiger, *Ausg. Verz.*, I, 193, F. 1 (1801), said that it was the *aprilina*, Linn.

Ernst & Engram., *Pap. d'Eur.*, VI, 77, f. 326e, f, g, h, i (1788), gave a series of five forms and one underside all very well done. The variation lying in the relative amount of the green, black and white and in the depth of these colours.

Esp., *Abbild. Noctuae*, IV, 276, plt. 118, 1-3 (1789+?), gave a recognizable figure, but the black markings were not characteristic.

Bork., *Naturg.*, IV, 141 (1792), described it under the name *runica*, he did not mention L., but put *aprilina* as dealt with by de Vill., and said it was the same species.

Donovan, *N.H. Brit. Ins.*, f. 347 (1802), gave a good but small sized figure with marking typical of the usual British form.

Hb., *Samml. Noct.*, f. 71 (1800-3) gave a good figure of a large distinctly marked example, in which the black markings formed an irregular W around the stigmata with a pedestal to the inner margin, under the name *runica*. Figs. 721-2 are also *aprilina* under the same name. 721 differs from 71 considerably, the black markings are more scattered and with some amount of white or light greenish-white.

Hb.-G., in the *Text*, p. 179 (1834), gave as synonyms *runica*, Schiff., *ludifica*, Sulz., and *aprilina*, Esp. Curiously Gey. said it was not the *aprilina*, Linn.

Dup., *Hist. Nat.*, VI, 365, plt. 95, 5 (1826), gave a good, but very dark fig. under the name *runica*, but it was the *aprilina*, L.

Barrett, *l.c.*, plt. 172, gave five figures, all good. 1a, ♀, has unusually dark hindwings with a whitish submarginal and a whitish blotch near the anal angle; 1c, the ground is a very delicate pale green and the markings a darker green, about the normal ground colour with no trace of the black or blackish colour of the usual markings.

Stdgr., *Cat.*, IIIed., 182 (1901), gave no forms but treated *runica*, Schiff., as a syn.

Spuler, *Schmett. Eur.*, I, 205, plt. 39, 6 (1905), gave an excellent figure of a ♀.

Hamp., *Lep. Phal.*, VI, 318, f. 104 (1906), gave a good b. and w. fig. and put *runica*, Schiff. (Hb.), as a syn.

South, *M.B.I.*, I, 290, plt. 141, 1 (1907), gave a good figure with the black markings somewhat run together across the disc of the forewing, tending to form a band.

Warr.-Stz., *Pal. Noct.*, III, 132, plt. 32d (1910), gave a very good figure; recognized only ab. *bouveti*, Lucas, and treated *runica*, Schiff. (Hb.), as a synonym.

Culot, *N. et G.*, I (1), 192, plt. 35, 8-9 (1913), gave three very fine figures: 1, typical; 2, ab. *bouveti*, a very delicate green, and 3, ab. *brunneomixta*, with all markings darker with brown but the stigmata are very prominent. The figures strike one as being of unusually large size.

Draudt-Stz., *Pal. Noct. Supp.*, III, 141 (1934), gave descriptions of all the forms and illustrated *bouveti* on plt. 171 (1934).

Barrett said of the Variation:

Usually very little variable in the size of the black markings, or the intensity and extent of their white edgings. In colour unfortunately it is unreliable, the green fading very slowly and imperceptibly, but surely, and becoming, in the course of many years even dull orange. At the same time the white lines fade quite away. In the North of Ireland, in Scotland, and even on Dartmoor, Devon, there is often extension of the black central band of the forewings, sometimes to a very considerable degree. In the collection of Mr P. M. Bright is a specimen taken in the New Forest, the ground colour of which is a singular greenish-white, with the black markings normal. One taken in Sussex by the Rev. E. N. Bloomfield is pale green, but devoid of black in the markings, which are merely indicated in paler colour.

The Names and Forms to be discussed:

aprilina, L. (1758); *Sys. Nat.*, Xed., 514.

runica, Schiff. (1775), *Verz.*, 70, F. Syn.

runica, Hb. (1800-3), *Samml. Noct.*, 71. Syn.

ab. *virgata*, Tutt. (1893), *Brit. Noct.*, III, 62.

f. *bouveti*, Luc. (1905), *Ann. Soc. Ent. Fr.*, 54.

f. *viromelas*, Slvgot. (1908), *Soc. Ent.*, XXIII, 74.

ab. *xantha*, Schwrd. (1909), *Verh. z. b. gess. Wien*, LIX (327).

ab. *brunneomixta*, Culot (1913), *N. et G.*, I (1), 192, plt. 35, f. 10.

ab. *semivirgata*, ab. nov. (E.A.C.).

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Books Wanted.—Draudt-Seitz Suppt., Vol. III (Noctuae), English preferred.—A. J. Wightman, "Auragó," Pulborough, Sussex.

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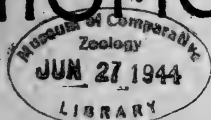
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MAY 1944

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NEW SUBSPECIES AND ABERRATIONS OF BRITISH MACRO-LEPIDOPTERA.

13820 By E. A. COCKAYNE, D.M., F.R.C.P., F.R.E.S.

Cerura bicuspis, Borkh., ab. **insignis**.

The dark median band is absent, but the thin black ante- and post-median lines, which demarcate the median area, are present. The sub-apical blotch is very pale grey.

Type: Male. Tilgate Forest, Sussex. Bred vi.1936 by W. H. Head, ex J. Hope coll. There is a figure of this beautiful aberration in Barrett's *British Lepidoptera*, vol. iii, pl. 101, fig. 1. It came from Tilgate Forest, and was in the collection of A. Robinson.

Pterostoma palpina, L., ab. **fasciata**.

The postmedian line on the forewing forms a dark brown fascia; the basal and median parts of the hindwings are much darker than usual, but there is a pale marginal band, broad and well defined, where the wing in a normal moth is darkest. On the underside of both wings the basal and median parts are unusually dark and the marginal area is light coloured.

Type: Male. Locality unknown. Ex Stevens, Vauncey Harpur Crewe, and Gilles collections.

Clostera pigra, ab. **alba**.

The wings, thorax, abdomen, and all other parts are white and without markings.

Type: Female. Locality unknown. Bred by William Dawes, ex Horne coll.

Tethea (Palimpsestis) ocularis, L., ab. **fusca**.

The forewings, hindwings, and thorax are much darker and more fuscous than those of the typical form and lack the pinkish hue; the darker colour makes the reniform and orbicular stigmata and the pale band on the hindwings more conspicuous.

Type: Male. Tooting, London, S.W. Bred 26.iv.1932, E. A. Cockayne. This appears to be the only form found in the London area, but I have not seen it from other parts of England or from the Continent.

Eriogaster lanestris, L., ab. **obsoleta**.

On the forewings the postmedian line is faintly visible near the costa, but even here it is narrow and pale reddish brown; elsewhere it is absent. At the base the usual white mark is only indicated by a few pale reddish-brown scales. The hindwing is concolorous.

Type: Female. Oxford, N. P. Fox.

This corresponds with ab. *obsoleta*, Tutt, in *Lasiocampa quercus* and *L. trifolii*.

Amathes xanthographa, F., ab. **alba**.

The forewings, hindwings, thorax, abdomen, and all other parts are white and without markings.

Type: Male. Bedford Purlieus, 8.viii.1902, ex Vipan coll.

Lampra fimbriata, Schreb. (*Triphaena fimbria*, L.), ab. **inornata**.

The forewings vary from ochreous brown to dull reddish brown in colour. The dark markings are indistinct and the usual pale lines are almost as dark as the ground colour, so that the wings appear to be nearly unicolorous.

Type: Male. Wimbledon. Bred 1898 by E. H. Taylor.

Paratypes: Three males and a female with the same data and a male. Monks Wood, Hunts, 4.vii.1905.

Mamestra brassicae, L., ab. **concolor**.

On the forewing the usual dark markings are present, but the subterminal line, the reniform stigma and the line around it, and all the paler areas present in a normal moth are brown like the ground colour. The basal part of the hindwing is darker than usual and the white mark at the anal angle is absent. The brown has a slight coppery gloss.

Type: Male. Burnley, 1921, W. G. Clutton.

Allotype: Female. Clapham, London, S.W., A. T. Stiff. Gregson says he has a similar specimen (*Entomologist*, 1868-69, 4, 52) and there is another in the Rothschild collection at Tring. The form is different from ab. *scotochroma*, Röber (*Iris*, 1884, 1, 340, pl. 13), which has a thin white subterminal line and white scales at the reniform and from ab. *unicolor*, Tutt, which is black with a white reniform.

Hadena thalassina, Rott., ab. **pallida**.

The usual blackish brown markings of the forewings are pale brown and thorax, hindwings and abdomen are much paler than usual. This gives it a unicolorous appearance.

Type: Female. Leigh, Surrey, 18.vi.1912, A. T. Stiff.

Hadena (Dianthoeicia) cucubali, Fuessl., ab. **pallida**.

All the dark markings of the forewings are replaced by markings of a soft light brown colour, but a pink flush is present. The hindwings and abdomen are very pale brown, and the thorax is almost white.

Type: Male. Enniskillen, Fermanagh, Ireland, 2.vi.1896, ex C. F. Johnson coll. This lovely aberration is in perfect condition and was probably bred.

Heliophobus saponariae, Esp. (*reticulata*, Vill.) ssp. **marginosa**, Haw.

English specimens vary very little, but the ground colour of both forewings and hindwings is straw-coloured and the markings have a yellowish tint. They are easily distinguishable from any other European or from Asiatic specimens, all of which are fuscous with a white or pinkish ground colour. Haworth (*Lep. Brit.*, 1809, 195, No. 101) named the species *marginosa* from two Yorkshire examples, and though his description is inadequate it must refer to the English form. Tutt in his *British Noctuae* makes a passing reference to *marginosa*, but does not appear to have noticed the constant difference between the English and all other forms. *Marginosa* seems to me to be a good subspecies.

Heliophobus saponariae, Esp., ssp. **hibernica**.

This is rather smaller than the typical form, but has the same fuscous markings, though of a darker shade. The ground colour is pink.

Type: Male. Co. Cork, Ireland, vi.1914. Bred by L. W. Newman.

Allotype: Female. Co. Cork, 4.vi.1915. Bred by L. W. Newman.

These Irish specimens are as dark as those from Uralsk, but have a beautiful pink ground instead of a white one. Very rarely Continental specimens have as pink a ground, but it appears to be present in all specimens from Cork and Waterford.

Celaena leucostigma ssp. **scotica**.

Smaller and darker than the typical form, which occurs on the Continent and in England. The length of the forewing is 15 mm. compared with 17 mm., which is the average length in English specimens.

Type: Male. Rannoch, Perthshire, 14.viii.1939, E. A. Cockayne.

Allotype: Female. Rannoch, 13.viii.1939.

In this species there are three forms: the plain form, *leucostigma*, Hb.; the intermediate form, *lunina*, Haw. = *intermedia*, Tutt; and the variegated form with strongly contrasting light and dark markings, *fibrosa*, Hb. All three forms occur in ssp. *scotica*, but in *lunina* the markings are much darker, and in *fibrosa* not only are the markings darker and more distinct, but the light areas are paler. Different shades of ground colour also occur, but they are darker than the corresponding shades in English and Continental examples, and the reniform stigma may be either ochreous or white. Some Irish specimens are as dark and rich in colour as *scotica*, but they are as large as typical ones. Huebner's figure of *fibrosa* is very brilliantly coloured and there can be little doubt that the red is much too bright. It probably represents the variegated form with a bright red-brown ground. Tutt uses the name *fibrosa* for any variegated form, whatever its ground colour, and this seems to me to be a correct course to adopt. It is certainly not synonymous with ssp. *scotica*, though it is often used incorrectly for all Scottish specimens. The ssp. *scotica* is widely distributed, but local, and is said to occur as far north as the Shetlands. There is no *Cladium*, or other sedge, and no *Iris* in many places where it is found, but the larger rushes are plentiful. I thought these were the probable food-plant, but Major Mackworth Praed has seen females ovipositing on blue grass, *Molinia coerulea*, in Argyllshire, which is strong evidence that this is the usual food-plant.

Leucania impura, Hb., ssp. **scotica**.

Slightly smaller and as a rule without the red tint so common in English specimens. The hindwings are uniformly black, and this colour extends to the inner margin and termen.

Type: Male. Rannoch, Perthshire, 1.viii.1938, E. A. Cockayne.

Allotype: Female. Kinlochewe, Ross-shire, 2.viii.1937.

Tutt points out the difference between English and Scottish examples in his *British Noctuae*, but for some reason did not name the latter. The typical form has even lighter hindwings than the English form, ab. *fuliginosa*, Haw., and the difference between a row of *fuliginosa* and *scotica* placed side by side is most striking.

Leucania straminea, Tr., ab. **ferrago**.

Head, thorax, and forewings unicolorous dark reddish brown; hindwings a paler shade of the same colour.

Type: Female. Wicken Fen, Cambridgeshire, vi.1913, R. Tait.

The colour is very similar to that of a bred specimen of one of the darker reddish brown forms of *Leucania lithargyria*, ab. *ferrago*, F., or *L. albipuncta*.

Panemeria tenebrata, Scop., ab. **nigrescens**.

The yellow colour of the hindwings is replaced by blackish brown.

Type: Male. Chelmsford, Essex, vi.1898, P. W. Abbott, ex Vipan coll.

SALE OF THE COLLECTION OF BRITISH LEPIDOPTERA FORMED BY THE LATE SIR BECKWITH WHITEHOUSE.

A third portion of the above collection was sold on the 21st and 22nd of February last at Messrs Glendining's Auction Rooms in Argyle Street, London. On this occasion the butterflies consisted chiefly of duplicates and minor forms and aberrations, and the following lots are selected as worthy of mention:

Euchloë cardamines, L.—A yellow-tipped ♂, ab. *lutescens*, £7 10/-. *Colias croceus*, Fourcy.—A purple-flushed ♀, £2 4/-. There was very little purple apparent on this insect and the description was flattering. *Apatura iris*, L.—A ♂ ab. *iole* in bred condition, £6 15/-. *Limenitis camilla*, L.—An ab. *nigrina* in bred condition, £2 2/-. was a decided bargain for the buyer. Another good example, £1 12/-. *Aglaia urticae*, L.—An ab. *nigrocaria* with black hindwings, in bred condition, ex Crabtree coll., £7 2/6. A form of same on pale ground colour, £2 12/6. A good example of ab. *nigrocaria*, £2 14/-. and a somewhat similar specimen, £2 2/-. An aberration of same with enlarged mauve lunules, £3 15/-. *Argynnis cydippe*, L.—An underside aberration almost devoid of silver spots on hindwings and black blotched on forewings, £7 5/-. *Argynnis selene*, Schiff.—A silvery underside, W. Penn, Sussex, £4. A ♀ blotched with black, A. Ford, New Forest, 1935, ex Bright coll., £2 15/-. *Maniola jurtina*, L.—An albino ♂ in fine condition, Warminster, ex Bright coll., £3 10/-. A golden ♂, Royston, 1923, Oliver, £5. An albino ♀, not perfect, 28/-. *Chrysophanus (Lycaena) dispar*, Haw.—A large ♂ in fine condition, ex Bond coll., £5 5/-. *Polyommatus icarus*, Rott.—A perfect gynandromorph equally divided in sexes, Co. Mayo, G. B. Hodgson, 1926, £5 10/-.

The collection of insects realized roughly £243. Two 20-drawer cabinets of oak, with glass tops and bottoms to drawers, realized £26 and £28 respectively, and a 40-drawer standard Brady cabinet, £40, bringing the total of the first day's sale to roughly £336. Generally prices realized throughout were more reasonable than on former occasions, and more in accordance with the pre-war standard.

At the second day's sale the Heterocera were sold and the collection included many rare and striking aberrations: The following lots are selected for reference: *Rhodometra sacraria*.—A ♀ with pink suffusion, £6 15/-. Pairs of bred *Catocala fraxini*, £4 to £5 each. *Catephia*

alchymista, F. H. Lees, Dungeness, 1934, £21. *Chariclea delphinii*, £4 15/-. *Acontia albicollis*.—Two specimens, £2 17/6 and £3. *Catocala nupta*, with chocolate hindwings, £5 10/-. *Endromis versicolora*, ab. *lapponaria*.—Two pairs, £4 10/- and £5. Two specimens of *lunaris*, £2 16/- and £5 15/-. Two specimens of *peregrina*, £4 5/- and £2 15/-. Two specimens of *Aplasta ononaria*, 34/-, 55/-. Some 46 lots of *Abraxas grossulariata* were included in the sale and realized a total of £94 odd, from 10/- to 65/- each. A form with white margins around wings, £8 15/-. A form with black borders, £5. The total sum realized by the moths in the second day's sale was roughly £243.

COLLECTION FORMED BY MAJOR BRIAN ARMSTRONG.

Except for a few special items the collection consisted chiefly of typical insects, but a specimen of *Heodes (Lycaena) phlaeas*, L., with extended black bands realized, £5 5/-, and an example of *Cosmolyce boeticus*, ♂, taken at Ditchling in October 1934, realized the good price of £7 15/-. Three 10-drawer American whitewood cabinets with mahogany facings fetched £10 10/-, £11, and £11 10/-, and a 50-drawer mahogany cabinet, £24. The insects brought £35, and the cabinets £57. A copy of Barrett's *Lepidoptera* in 11 volumes was sold for £16 10/-, which is about the average value of the work second-hand.

PARNASSIUS APOLLO, RACE KOSSWIGI, DE LATTIN.

By MALCOLM BURR, D.Sc., F.R.E.S.

(Concluded from page 41.)

A large number of *apollo* races are already known from the Asia Minor peninsula, but until now they all remained in the central and east Anatolian district, confined by its higher mountain tops and the Armenian plateaux; in the west, on the other hand, the species is not apparent. The accompanying map shows this distribution. Then a short time ago I received, through the kindness of Prof. Dr C. Kosswig, of Istanbul, a ♂ and ♀ of a race of *apollo* which flies at about 2500 m. on Uludagh in N.W. Anatolia. When, as the result of further captures, this race could be confirmed, a description of this subspecies was drawn up, although the recently collected material will only be available at the end of the war.

Types: 1 ♂, 1 ♀ from Uludagh (Kesis, mysischer Olympus), south-east Brussa, at about 2200 m. on the s.w. side; end July 1938; collected Kosswig, in coll. de Lattin.

Kosswigi differs also very definitely from the Anatolian race group of *peroneurus*, Bryk, by its smaller size, the much smaller forewing spots and ocelli, as well as by the fainter and shorter edges to the bands on the forewings, and these are completely absent on the hindwing; it is nearest in the group to *peroneurus* itself, which, however, is sufficiently different. There is a greater likeness between the new race and the Balkan *libernicus*, Reb. & Rghfr., group, especially with its most southerly Greek representative, subsp. *grajus*, Stich., one can establish very marked agreement, for it differs from this only in very slight characteristics, such as stronger ocelli edges and pupils, missing

submarginals on the hindwing, strong anal spots. It would be best to bring it into this group.

From the zoo-geographical point of view the discovery of this race is of importance in two respects. Firstly as a result of it there is the connection between the—until now—widely-separated districts of the Anatolian *peroneurus* and the Balkan *libernicus* group, which is of considerable value in explaining the connection. On the basis of this discovery we can expect to find *apollo* on other high mountains (i.e., on Bosz dagh); especially as it has been established that this race has a relatively late flying time, namely, from the end of July to the beginning of September, which may easily lead to the species being overlooked, so that even such a successful collector as Mann never found it on his many trips to these mountains.

Far more startling, however, is the fact that the new race does not belong, as one might expect, to the Anatolian race group, but quite definitely shows a close affinity with the Greek race. Although we know a large number of species with Greek-Anatolian distribution, which are not found in northern Thrace, and so point to an older close connection in the fauna, nevertheless it must be rare for such a relationship to be shown through races of a species, which are in general a lot younger taxonomically. From this point of view the discovery of the new Uludagh race may also lead a little to the clarification of the zoo-geographical connection with the eastern Mediterranean region.

COLLECTING NOTES.

CORRECTION.—In the April number the author's addition to his note on *Synthymia fixa* on p. 50 (line 1), "This little Noctuid . . . idea of its appearance" (line 4) should have been placed in the make up after "accidentally" on (line 12) *Metilectra quadrisignata*.

SOME FURTHER NOTES ON TURKISH BUTTERFLIES SENT BY DR BURR.—A further consignment of butterflies from Turkey reached me some little time ago, but I have only just been able to finish examining them. They had unfortunately travelled badly, and though some of the larger ones arrived in good condition, hardly any of the smaller ones were available as specimens, though most of them were quite recognizable. Of those from the immediate neighbourhood of Constantinople there is little fresh to be said. The *allionia* form of *H. statilinus* is evidently common on both sides of the Bosphorus as also appears to be the case with *E. alceae*, *A. linea (flava)* and *P. icarus*; the ♀s of the latter are generally brown, but one is blue to the border; they vary greatly in size. All the specimens of *H. admetus* which were sent were of the *ripartii* form. The ♀s of *L. argiolus* (2nd brood) have broad black borders, almost as broad as those from Cyprus.

Far the most interesting are the specimens from the Asiatic Mt. Olympus, especially those of *P. apollo*, r. *kosswigi*, first described in 1941. The race does not appear to be very distinctive though more so than some of the named forms. It is rather smaller than the average, with white ground colour, the ♂ with small red spots and scarcely marked

towards the border, with no red spots at the anal angle of the hindwing. The ♀s considerably darker with large spots both red and black. One is definitely an aberration reminding one of the *nigrescens* form of ♀ *P. delius*; it has very large spots near the border of the hindwing and two red spots at the anal angle; the border of the forewing is also dark and there is a good deal of dark dusting over the disc. On the underside both sexes have 2nd spots at the anal angle. There is a fine *A. aglaia* (in excellent condition) and a rather large *M. didyma*. Two "blues" I have as yet had no means of determining. One is probably either *P. hopfferi* or *P. poseidon* judging from Miss Fountaine's account of Asia Minor blues; of the other I can make no suggestion.—GEORGE WHEELER.

MICE EATING MOTHS.—With further reference to recent notes by S. G. C. Russell (December 1943) and H. Donisthorpe (February 1944), mice in our laboratory have been found to eat the bodies of the moth *Ephestia sericarium*, Scott (= *kuehniella*, Zell.).

For rearing purposes moths of this species were kept in glass jars 3½ inches deep with flour at the bottom. The mouth of each jar was covered with gauze and a hole in the centre of the gauze was plugged with cotton wool. The jars had been set up for several days when it was noticed one morning that the cotton wool plugs had been removed and the flour disturbed. In one particular jar it was found that only the wings of moths were left. The jar contained both live and dead moths, and as the live specimens could escape it is impossible to say whether the mice did eat live moths or only dead ones.

O. W. Richards and W. S. Thomson (*Trans. Ent. Soc. London*, lxxx, 31/12/32) recorded that mice were found to be a serious nuisance when conducting, under laboratory conditions, their researches on this moth. They also note another record made by Johnson (1895), that a house mouse ate 254 pupae of *E. sericarium* in one night.—MARGARET C. MALCOLM, Natural History Dept., University College, Dundee.

NOTES FROM THE NORTH OF IRELAND, 1943.—After an exceptional, mild winter the season opened very early with *Nymphalis io* on 3rd February. *Colostygia multistrigaria* was on the wing in numbers after dusk on 20th February; the following day larvae of *Euphydryas aurinia* were on the move and basking in the sunshine outside their winter webs.

Towards the end of the month, when moving a stack of peats, which had stood out on the bog all winter, swarms of *Lepidoptera* were disturbed from their hiding places among the dry peat, the most abundant being *Agonopterix ocellana* and *A. conterminella* with an occasional *A. assimilella* and several *Chloroclysta miata*.

Xylocampa areola was found at rest on a gate post on 18th March. The nights were very cold, when the willows were in bloom and very few moths were attracted; a few *Orthosia munda* and *O. gracilis* being about the best. *Gymnoscelis pumilata*, a rare insect here, appeared on 22nd April and on the same date the first *Pieris brassicae* male was observed.

During the early part of May the weather was cold and unseasonable with ground frosts at night.

On the 7th *Hydriomena ruberata* was out among willows, and *Bapta temerata* was beaten out of Blackthorn; *Pararge megera* and *Thecla rubi* appeared together on the 17th; on the same day a female *Cynia mendica*

race *rustica* with the forewings marked with black streaks emerged from a local pupa.

On the 20th *Chiasmia clathrata* and *Callimorpha jacobaeae* were disturbed in a meadow, and a large female *Macrothylacia rubi* was found at rest in the heather, and *Dyscia fagaria* flying among swarms of *Ematurga* (*Cepphis*) *atomaria*.

24th May produced *Eucosma subocellana* flying in the afternoon sun among willows, and *E. tetraquetra* around the birches; in the evening a male *Biston betularia* was found at rest in a patch of sedges growing beneath a large willow bush, and *Thyatira batis* was netted at dusk; a very early date for this district.

Eulia ministrana was beaten out of birch on the 29th, the same day *Heodes* (*Lycaena*) *phlaeas* was observed and *Ligdia adustata*, *B. temerata*, and *Apamea rurea* were netted at dusk.

A single *Vanessa cardui* appeared on the roadside on the 30th.

On 1st June *Hadena cucubali* and *H. bicruris* occurred after dusk over silene.

The first *E. aurinia* was flying on a railway bank on 6th June, and *Chlidonia baumanniana* was disturbed from among the scabious in some numbers; *Ortholitha umbrifera* was beaten out of Gorse. On the 8th *Procris statice* was flying in numbers in a marshy meadow, and *Erastria uncula* was not uncommon among the sedges.—(To be continued.)—THOMAS GREER.

EARLY APPEARANCE OF HEMARIS TITYUS, L. (*bombylifomis*, ESP.).—On 30th April I caught a worn and faded specimen of this moth while it was flying at an early blossom of *Lathyrus montanus*, Bernh., the only other plants in bloom at the spot being Primrose and *Fragaria vesca*, L. Last year this moth first appeared on 19th May. The present season is by no means an "early" one in this district, and the Bluebells (*Scilla non-scripta*, Hoffm. & Link) are only just coming into bloom in sheltered spots. The first *A. cardamines*, L., was seen on 26th April (last year, 3rd April).—P. B. M. ALLAN, Newtown, Montgomeryshire.

FOODPLANTS OF VANESSA CARDUI, L.—With reference to Prof. J. W. Heslop Harrison's note at page 25, for some years I have kept a record of the foodplants of British Macro-Lepidoptera as noted in the entomological journals. The following plants appear in my list as affording nourishment to *V. cardui* in the wild, and quite possibly I have overlooked other "mentions":—*Carduus arvensis*, Robs., *C. lanceolatus*, L., *C. nutans*, L., *C. crispus*, L., *Onopordon acanthium*, L., *Arctium minus*, Bernh., *Echium vulgare*, L., *Malva sylvestris*, L., *Filago germanica*, L., *Urtica dioica*, L., and *Phaseolus coccineus* (Scarlet Runner Bean). Prof. Heslop Harrison's record of this species ovipositing on *Carlina vulgaris*, L., is therefore—so far as I am aware—a new one. It is possible that these larvae could be reared on any British species of *Carduus* (in which I include *Cirsium* (*Cnicus*), my nomenclature being that given by B. & H. seventh ed.) and indeed on the other three genera of the tribe *Cynareae*, namely *Serratula*, *Saussurea*, and *Centaurea*. Perhaps some of your readers who have the opportunity will put this to the proof during the coming season. It may be that this globe-trotting butterfly has an even wider range of foodplants in Great Britain than is suspected.—P. B. M. ALLAN.

SPRING NOTES, 1944: EARLY APPEARANCE OF *COLIAS CROCEUS*, FOURCY.
 —In this district after a very cold November and December we had a very wet January followed by an abnormally dry and sunny February, during which only eight wet days occurred and there were 96 hours of sunshine (11 hours above the average. March continued cold and dry until the 12th, when a real summer day intervened followed by a wet day on the 14th. The rest of the month continued cold and sunny and with all vegetation very backward. Sallow commenced to blossom on the 25th. On 1st April a wet day occurred, the first for five weeks, and the two following days were wet since when to date, May the 1st, there has been continual sunshine. In spite of all this fine weather the usual hibernating butterflies have been nearly a month later than last season. Last year all the hibernators were on the wing by 10th March. This season all the Vanessas are very scarce up to the present. The continual sunshine has hastened the day feeding larvae of *Brenthis* (*Argynnis*) *euphrosyne*, and on the 27th April I saw several on a sheltered railway bank here together with several *Euchloë cardamines*, L. On this same bank to day, 1st May, I saw half-a-dozen *B. (A.) euphrosyne*, L., several *Pararge megera*, L., several skippers, one *Lycænopsis argiolus*, and to my surprise a male *Colias croceus*, Fourcy. He was weak on the wing, and possibly had only just arrived. This is the earliest date I have ever seen this species in this country and it's appearance may foretell a "croceus year." As yet there is no sign of *B. (Argynnis) euphrosyne*, in the usual woodland haunts. *Polygonia c-album*, L., is decidedly scarce this spring as is *Aglais urticae*. *Nymphalis io*, L., is out in good numbers and *Pararge aegeria* very plentiful. I have seen two *L. argiolus* for the first time in this locality. *Gonepteryx rhamni*, L., is also in evidence.—S. G. CASTLE RUSSELL, Springetts, Highcliffe-on-Sea.

CURRENT NOTES.

THE Insect Immigration Committee of the S.E. Union of Scientific Societies are anxious to trace the swarms of insects recorded as arriving in the British Isles to their source. Foodplants of the larvae of these insects, dates of emergence, incidents of the mass assembly, direction of final movement, and estimate of the number of individuals. Place of rest on the passage to Britain, the direction of the wind, and climatic notes are important. With British observers in many places in the Mediterranean area, there must be numerous trained observers of nature. Will they help!

LONDON entomologists are now able to collect regularly only nearer home, with the result that *L. camilla*, *A. adippe*, *A. iris*, *V. comma*, *quercifolia*, etc., have been taken at near London localities where no record was known in olden times. Many years ago, when a boy, the larvae of *Arctia caja* was to be found in practically every garden. Now one rarely or never hears of its occurring. It is well worth breeding time after time. Those who have visited the S. London Society's Exhibitions must well know what wonderful specimens are at times obtained by careful crossing and breeding. Even more than 150 years ago won-

derful forms were obtained as are shown on the plates in Ernst and Engramelle's *Papillons d'Europe*, 1780-90. But we do want all the data of the crossing and breeding which those who have carried on experiments with *caja* and *grossulariata* have never kept.

THE *Ent. News* (Philadelphia) for last December gave an interesting account of a "Neon-sign Dance of the Waterboatman (*Tricorixa verticalis*, Fieb.) (Hemiptera)." The sign was attached to a drug shop at Tiptonville, Tennessee, about ten feet from the ground and a "ball" of these insects was in constant motion in front of the red and blue letters. The mass kept together for several minutes; then they moved away below the sign. The mass became less dense when out of the glare of the light. In a few minutes they came back and again formed a dense mass and danced as before. This occurred again and again. The observer wished to know the cause of this curious habit. It did not seem to be mating. Was it insects only enjoying life to the utmost?

DR BRYAN P. BEIRNE, M.A., M.Sc., etc., of Trinity College, Dublin, has communicated to the *Irish Nat. Jr.*, March 1944, the results of his observations on the curious distribution of the Maritime Lepidoptera around the large inland lake, Lough Neagh. The species concerned are *Agrotis vestigialis*, *A. tritici*, *Procus literosa*, *Euxoa nigricans*, *Epirrhoë galiata*, and *Stilbia anomala*. All these species occur at many places on the sea coast, N., E. and S.E. The author's remarks are well emphasised by 6 diagrams showing the position of the habitats of these species both on the sea coast and the lake coast. Not one species is found on the N.E. and S. but all at localities on or near the west coast of the Lough. After considerable study Dr Beirne sums up as follows: "From a study of their distribution and habits it is concluded that they arrived in the country during the late-glacial Zone II period, were restricted to the coasts by the more severe climate of the Valley Glaciation (Zone III) period, and migrated into the Lough Neagh area along a direct connection between Lough Neagh and the sea, probably along the present course of the Lower Bann, in the early post-glacial. Judging from their distribution the maximum of the Antrim Coastal Re-advance preceded the Zone II period, but it is possible that the eastern coast of Antrim was ice-covered during the Zone III period." Such studies are of the greatest interest to all those entomologists who have got beyond the phase of merely making a collection.

RACES AND SUBSPECIES.—In the *Entomologist's Record* for April (antea p. 52) the statement occurs: "Races are *not* subspecies." This, however, depends on the individual point of view taken by the writer, whether he be a Lepidopterist, Hymenopterist, or Coleopterist.

In a paper on the subspecies and aberrations of our eleven-spot Ladybird [*Ent. Rec.*, 30, 28 (1918)] I quoted some remarks published by the late Lord Rothschild in a paper read before the R. Ent. Soc. of London on 6th February 1918 which may, with advantage, be repeated here: "Nomenclature was invented to enable people at a distance and also when in company to discuss the objects of their mutual study in the easiest and shortest manner possible. Now Linnaeus, the father of our zoological nomenclature, established the

categories of genus and species and used the word *varietas* to denote local or geographical race . . . but later authors used the word *varietas* to denote both local race and individual variation, so the bulk of modern zoologists have abandoned the use of the word *varietas* altogether. They substitute for it the words *subspecies*, denoting local or geographical race, and *aberration*, denoting an individual variation . . . " In the *Formicidae* we do not use the word *aberration*, but *variety*. A *subspecies*, however, is a local or geographical race—Forel's "race" and Santschi's "stirp."

The modern tendency among entomologists in general seems to be to use *subspecies* for a local or geographical race, or species in the making, and *aberration* for a sporadic variety that may occur anywhere with the normal form.—HORACE DONISTHORPE, Entomological Department, British Museum (Nat. Hist.), 26.iv.44.

REVIEW.

AN IMPORTANT STEP FORWARD IN FORMICID NOMENCLATURE. By B. D. WRAGGE MORLEY, B.A., F.L.S.

The recent publication of Donisthorpe's "List of the Type-Species of the Genera and Sub-genera of the *Formicidae*" in the *Annals and Magazine of Natural History* (Ser. II, Vol. x, pp. 617-648, 649-688, and 721-737, 1943) is an event of considerable importance to myrmecologists.

The *Formicidae* to-day number some five thousand described species, which are distributed amongst rather less than four hundred genera and fourscore tribes belonging to eight sub-families; yet, as Donisthorpe points out in the foreword to his paper, only three previous attempts have been made to describe the framework on which this mass of taxonomic data rests.

In 1911 and again in 1913, Wheeler, then not so well-versed in ant nomenclature, published lists of the genera and their types, but these were unfortunately both incomplete and inaccurate.

Emery in the "Genera Insectorum" (1910, *Dorylinae*; 1911, *Ponerinae*; 1912, *Dolichoderinae*; 1922, *Myrmicinae*; and 1925, *Formicinae*), also lists types for the genera and sub-genera, but again there is much inaccuracy.

The value of Emery's work in the "Genera Insectorum" is also lessened by its incompleteness; the use of an already abandoned scheme of classification, dividing the *Formicidae* into five sub-families instead of the modern eight (*Dorylinae*, Leach; *Ponerinae*, Mayr; *Cerapachyinae*, Wheeler; *Leptanillinae*, (Emery) Wheeler; *Myrmicinae*, Lepeletier; *Pseudomyrminae*, (Emery) Wheeler; *Dolichoderinae*, Forel; and *Formicinae*, Forel); and not least of all its inaccessibility.

Donisthorpe's list is therefore the first complete (as far as is known) and authoritative list of the genera and sub-genera with their types to be published. Not only are the genera themselves listed, but the tribes and sub-families to which they belong are cited.

Four hundred and fifteen genera and two hundred and fifty-two sub-genera are listed, of which forty-seven genera and twenty-one sub-genera are cited as synonyms, giving a total of three hundred and sixty-three

genera and two hundred and thirty-one sub-genera as against the two hundred and sixty genera and two hundred and thirteen sub-genera mentioned by Emery in the "Genera Insectorum."

The citing of the tribes and sub-families will no doubt give rise to much criticism and argument, since, owing to the nature of the paper no explanation or baulking of a decision was possible, and there are in the *Formicidae*, as in all groups, many doubtful cases—genera which may be placed in one tribe or another and even tribes which may be placed in one sub-family or another.

The tribes *Acanthostichini*, Emery, and *Cylindromyrmicini*, Emery, are a case in point. Emery in the "Genera Insectorum" places both tribes together with the *Cerapachyini*, Forel, in the section *Prodorylinae*, Emery (later to become the sub-family *Cerapachyinae*, (Emery) Wheeler); Wheeler ("Key to the Genera and Sub-genera of Ants," *Bull. American Mus. Nat. Hist.*, xlv, 631-710; 1922) places the *Acanthostichini* together with the *Cerapachyini* in the *Cerapachyinae*, relegating the *Cylindromyrmicini* to the *Ponerinae*. Now Donisthorpe places the *Cylindromyrmicini* in the *Cerapachyinae* with the *Cerapachyini*, relegating the *Acanthostichini* to the *Ponerinae*!

Yet Donisthorpe is to be congratulated on the boldness of his decision to include this extra information, for there is no student of myrmecology to-day better fitted to undertake such a task, and there can be no doubt that despite the uncertainties, which it must gloss over, this action adds greatly to the value of the list.

Much of the synonymy is interesting. For example *Sima*, Roger, is sunk as a synonym of *Tetraponera*, Smith, and *Pachysima*, Emery, formerly a subgenus of *Sima*, is raised to generic status. *Lasius*, Fabricius, also sinks on account of Jurine's earlier name, *Acanthomyops* taking its place. This is in accordance with the arrangement used in Donisthorpe's "British Ants," but unfortunately the Royal Entomological Society retained the use of *Lasius* in their Check List of the British *Hymenoptera*, thus prolonging the life of this incorrect name. Ruzsby's subgenus *Lasius* also sinks to Morrice and Durrant's *Donisthorpea*, while *Acanthomyopsini* is substituted for Emery's *Lasiini* ("Gen. Ins."). The mis-spelling of *Crematogaster*, Lund, by Wheeler ("Ants," 1910), Forel ("The Social World of the Ants," London, 1927), and Donisthorpe ("British Ants," 1927) is corrected, (to *Cremastogaster*) having been omitted. Emery's ("Gen. Ins.") mis-spelling of *Chtonolasius*, Ruzsby, copied by Donisthorpe ("British Ants," 1927) is also corrected.

Nomenclature should be an aid to the zoologist; a mechanism enabling him to handle simply and accurately the data appertaining to his subject, not a riddle and cause of extra work and mis-understanding. Thus the taxonomy of a group should be well ordered, comprehensible, and easily accessible.

Donisthorpe's List is of great value in clarifying and making accessible the framework of the taxonomy of this difficult and heterogeneous group of insects and is an important step forward in Formicid Nomenclature.

Tutt dealt with (1) the typical form and (2) the ab. *virgata*, a banded form.

f. *runica*, Schiff., Verz., 70, F. (1775).

ORIG. DESCRIP.—“This greenish-white Noctua marked with black characters is very near *N. aprilina*.” Illiger, *Ausg. Verz.*, I, 192, discussed the similarity of *runica* and *orion* and the *aprilina* in the works of Linné (1801).

Hb., *Text*, p. 179, in his note on fig. 71, said that his figure was the *runica*, Schiff., and the *aprilina*, Esp., but not the *aprilina*, Linn.

“The insect which still remains in the Linn. cabinet dispels all doubt.” Gn. quoted by Tutt = *aprilina*, L.

ab. *bouveti*, Lucas, *Ann. Soc. Ent. Fr.* (1905), 51 [*Culot, N. et G.*, I (1), 192 (1913)].

FIG.—[*Culot*, plt. 35, 9].

DESCRIP.—“This curious form in which the black markings of the forewings are completely wanting came from Tarf (Algeria).” It is a very beautiful and delicate green of various shades.

ab. *viromelas*, Slevogt., *Soc. Ent.*, XXIII, 74 (1908).

ORIG. DESCRIP.—“In Bathen, Kurland, there flies a melanic form of *Dichonia aprilina*, in which by the considerable increase of the black markings the pale green ground colour of the forewings is very much curtailed. I think I should name this ab. *viromelas*.” “Prof. Rebel, to whom I sent a specimen of this form, thought it was identical with the *virgata*, Tutt.”

f. *xantha*, Schwrd., *Verh. Ges. Wien*, LIX (327) (1909).

ORIG. DESCRIP.—“The beautiful pale green colour has become bright yellow turned into brown colour in some places.” He named it *xantha*. Digne.

ab. *brunneomixta*, *Culot, N. et G.*, I (1), p. 192 (1913).

FIG.—*l.c.*, plt. 35, 10.

ORIG. DESCRIP.—“The green of the upper wings is replaced by brown.” He considered it a melanistic form.

Ab. *semivirgata* ab. nov.

ORIG. DESCRIP.—The space between the median line, which crosses the forewing between the reniform and orbicular stigmata, is filled in with black, which either completely obliterates or obscures the orbicular. The rest of the wing is normal or more lightly marked than usual. The sharply demarcated narrow black band gives the insect an appearance very different from that of ab. *virgata*, Tutt.—E. A. COCKAYNE.

Type. Female. Forres, Scotland. 1898. E. A. Cockayne coll. There is a similar specimen from Enniskillen in the Rothschild coll.

Brotolomia, Led. (1857), *Stdgr.*, *Culot* [*Trigonophora*, Hb. (1821), *Hamp.*, *Warr.-Stz.*, *Drdt.*: *Phlogophora*, Ochs. & Tr. (1816-25), *Gn.*, *Barr.*: *Hadena*, Schrank (1802), *Meyr.*, *Meyr.*: *Solenophora*, Dup. (1844), *H.-S.*], *meticulosa*, L.

(1) The collective name *Trigonophorae* was used for the *meticulosa* Group by Schiff. in 1775 *Verz.*

(2) Lederer, *Noct.*, 115 (1857), points out that *Solenophora* was not valid in Lepidoptera as it had previously been used in Coleoptera in 1832.

Tutt, *Brit. Noct.*, III, 63 (1892): Meyr., *Handbk.*, 127 (1895): Barrett, *Lep. Br. Is.*, V, 55, plt. 190, 3 (1899): Stdgr., *Cat.*, IIIed., 185 (1901): Splr., *Schm. Eur.*, I, 211, plt. 41, 27 (1906): South, *M.B.I.*, I, 291, plt. 41, 7 (1907): Hamp., *Lep. Phal.*, VII, 487, f. 96 (1908): Warr.-Stz., *Pal. Noct.*, III, 190, plt. 44a (1911): Culot, *N. et. G.*, I (1), 203, plt. 37, 9 (1913): Meyr., *Rev. Hand.*, 80 (1928): Drdt.-Stz., *Pal. Noct. Supp.*, III, 169 (1934).

Like many of Linné's descriptions in the *Systema*, this one is very short and more or less unrecognizable but his reference to illustrations are adequate for determination. In the case of *meticulosa* he referred to Goedart, Reaumur, Merian, Albin, de Geer, and Wilkes for figures.

Linn., *Sys. Nat.*, 513 (1758), used the term "incarnata" in his description, thus designating the red-marked form as the type. This is the rarer form in Britain.

Hufn., *Berl. Mag.*, III, p. 214 (1766), described the forewing as partly greenish, partly reddish, partly ochre-yellow, with a triangular blotch of copper-colour. The underside with white and reddish gloss.

Schiff., *Verz. Noctuae*, P. 1, 83 (1775) associated this species with *satura*, *lucipara*, *serena*, *protea*, etc., in *Trigonophora* (bearing on the forewing a triangular character).

Ernst & Engram., *Pap. d'Eur.*, VII, 110, f. 487c, d, e, f (1790), gave a life-history, references to no less than 32 (27 authors) works previously published and four quite good figures of the imago, all of them appreciably darker than our ordinary form. Only one figure has any green coloration and that is on the underside, although in the description of the upperside "tantôt verd sombre tantôt jaunâtre" is noted inside the fringe of the forewing and "un verd brun" generally for the triangular central area. The authors lay stress on the variation in colour, but not on other characters of the species.

Hb., *Samml. Noct.*, 67 (1800-3), gave a good dark figure, and in his *Text*, p. 177, referred to the brownish, reddish and greenish marking, the olive-brown band, the yellowish lower wing, half with grey scaling.

Esp., *Abbild. Noct.*, IV, 220, plt. 112, 3 (1789²+), gave a recognizable figure. His notes contain a large number of references and extracts from all the previous authors.

Donovan, *Nat. Hist. Brit. Ins.*, plt. 139 (1796), gave an excellent figure of apparently a freshly emerged specimen with the green flush very well expressed.

Haw., *Lep. Brit.*, 244 (1809), described a red form.

Dup., *Hist. Nat.*, VI, 34, plt. 94, 3 (1826), gave a good figure with all the markings heavy. In his description he emphasized the green coloration somewhat, and compared the general coloration of *meticulosa* with that of the "lime hawk."

H.-S., *Sys. Bearb.*, II, 300 (1850), commented on the figure Hb. 67 as too variegated.

Gn., *Hist. Nat.*, VI, 65 (1852), gave the red form as his var. A.

Barrett, *l.c.*, plt. 190, gave two very good figures.

Stdgr., *Cat.*, IIIed., 185 (1901).

Hamp., *Lep. Phal.*, VII, 487, fig. 96 (1908), did not mention the green-shaded form.

Splr., *Schm. Eur.*, I, 211, plt. 41, 27 (1906), gave a good figure of the typical red form and included f. *pallida*, Tutt, as the common form in England.

South, *M.B.I.*, I, 291, plt. 141, 7 (1907), gave a well-marked figure of this species, but the exceedingly pretty colour is not in evidence. He emphasized the fact that "after death the olive-green fades and distinctly mars the effect of the general colour scheme."

Warr.-Stz., *Pal. Noct.*, III, 190, plt. 44a (1911), gave three good figures: a typical dark reddish brown form (and noted Tutt's *pallida* as the same, which it is not); and described and figured two new abs., *suffusa* and *roseobrunnea*, the former being the var. A. of Gn.

Two figures on the same plate of the Japanese *beatrice* and its ab. *caesia* form seem to agree so closely that they, from the figures, should be representatives of the E. Asian race. They are considered by Warr.-Stz. to belong to another genus *Chortapha*, Moore, and with only the slightest of differentiation.

Culot, *N. et G.*, I (1), 203, plt. 37, 9 (1913), gave a good figure of a form without the green flush and not as dark as most continental figures.

Drdt.-Stz., *Pal. Noct. Supp.*, III, 169, included two new forms, *ignicula*, Dnhl., from the Sabine Mts., Italy, and ab. *minor*, Cabeau, from Belgium, "a superfluous denomination."

Variation as noted by C. G. Barrett:

"Variable in the darker portions of the forewings from olive-green to red, but this is partially the result of a kind of fading, specimens which emerge with strong olive-green tints changing gradually to red-brown; indeed this species, in this respect shows a wonderful parallelism with *Smerinthus tiliae*. Occasionally specimens occur with these darker portions of a rich glowing red. One such example is in the collection of Professor R. Meldola."

It appears that on the Continent as in Britain this species normally emerges with very beautiful combinations of green with various other colours, and that within a very short time the brilliancy of these colours fade, especially the green shades. Thus it appears that those authors who describe from specimens which have been cabinet specimens for even a short period omit mention of the green colour combinations. Still the depth and area of deeper colour tends to be emphasized on the Continent more than here.

The Forms and Names to be considered:

meticulosa, L. (1758), *Sys. Nat.*, 513, No. 95.

f. *pallida*, Tutt (1892), *Brit. Noct.*, III, 63.

ab. *suffusa*, Warr.-Stz. (1911), *Pal. Noct.*, 190.

ab. *roseobrunnea*, Warr.-Stz. (1911), *l.c.*

ab. *minor*, Cabeau (1925), *Rev. Namur.*, XXV, 7.

ab. *ignicula*, Dnhl. (1926), *Ent. Zt.*, XXIX, 168.

Tutt dealt with (1) the typical dark form common abroad and (2) the form *pallida*, commoner in Britain.

ab. *suffusa*, Warr-Stz., *Pal. Noct.*, III, 190 (1911) = var. A., Guen.

FIG.—*l.c.*, 44a.

ORIG. DESCRIP.—“The whole forewing is tinged with reddish, partially obscuring the usual olive-green tints. There is no ground whatever for supposing that the red-suffused form is the typical form of Linné and Haworth.”

ab. *roseobrunnea*, Warr-Stz., *Pal. Noct.*, III, 190 (1911).

FIG.—*l.c.*, 44a.

ORIG. DESCRIP.—“Has the central triangle rich red-brown tinged with fulvous, the whole wing reddish tinged, and the green shades all strongly mixed with reddish, the metathorax and dorsal tufts also being deep fulvous instead of green. Azores, etc.

ab. *minor*, Cabeau, *Rev. Mens.*, XXV, 7 (1925)

ORIG. DESCRIP.—“A ♂, 40 mm., captured at Theux, Belgium. Drdt.-Stz., *Pal. Noct. Supp.*, III, 169, 34, considered this name superfluous for a not even abnormally small specimen.

ab. *ignicula*, Dnhl., *Ent. Zt.*, XXIX, 168 (1926).

ORIG. DESCRIP.—“I possess a *meticulosa* from Subiaco in the Sabine Mts., which in general approaches the *roseobrunnea*, Warr. There remains still some of the grey-green or green-olive tone. The ground colour is somewhat of an orange-red. There is scarcely any of the olive-green tone left (in the outer basal area), the markings, especially the discal triangles, are not appreciably darker. Yet it does not agree with the *roseobrunnea* from the Azores; it is not so extreme,” being much redder.

ab. , Hoffm. & Klos., *Schm. Sturm.*, III (1915), 97.

ORIG. DESCRIP.—“Klos bred in Stainz an especially dark example which he described as dark copper-red. This form is probably unnamed.”

This form may probably come under the above form *ignicula*, Dnhl.

Euplexia, Steph. (1829), most authors. [*Hadena*, Schrnk. (1802), Meyr., Meyr.: *Trigonophora*, Hb. (1821), Tr., Bdv. Dup.] *lucipara*, Linn. (1758).

Tutt, *Brit. Noct.*, III, 64 (1892): Meyr., *Handbk.*, 128 (1895): Stdgr., *Cat.*, IIIed., 155 (1901): Hamp., *Lep. Phal.*, VII, 241 (1906): Splr., *Schm. Eur.*, I, 211, plt. 41, 25 (1906): South, *M.B.I.*, I, 291, plt. 141, 5 (1907): Warr.-Stz., *Pal. Noct.*, III, 188, plt. 43i (1911): Culot, *N. et G.*, I (1), 202, plt. 37, 7 (1913): Meyr., *Rev. H.*, 81 (1928): Drdt.-Stz., *Am. Noct.*, VII, 113, plt. 31i (1925).

Linn., *Sys. Nat.*, Xed., p. 518 (1758), gave a short but sufficient diagnosis of *lucipara*, “purpurascens” wings, “nigra” fascia, and “flava” outer stigmata. This description in XIIed., II, 857 (1766), was practically unaltered.

Schiff., *Verz.*, 84, P. 3 (1775). Associated with *meticulosa*, *cucubali*, *serena*, etc.

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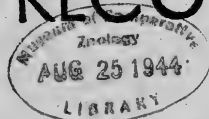
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13,820



Among the many interesting forms of Lepidoptera, which are to be found on the coast of North Wales is a race of *Eumenis semele* which occurs on the limestone cliffs of the Creuddyn Peninsula in Caernarvonshire.

This peninsula is a perfect example of a biological island and possesses a flora and fauna in many ways presenting a striking contrast to the mainland.

During the past two summers I have been able to visit this locality with Dr H. B. Williams, who agrees with me that the *E. semele* which occur here are worthy of subspecific rank. Accordingly I name it

EUMENIS SEMELE, L., ssp. **thyone**, ssp. nov.

♂. Strikingly smaller than any other British race of *semele*, those in my series of over 100 specimens, collected at random, averaging only 47.7 mm.

The coloration is more uniform than in typical *semele*, with the pale areas more ochreous. The forewing spots are smaller than in other races, with the lower of the two frequently absent, and totally obsolete specimens are not very rare. The underside has the coloration duller and less contrasting than in the type, with the white portions of the hindwings tinged with ochreous. The tendency to obsolescence is even more striking on the under surface than on the upperside.

♀. Similarly smaller than other races, those in my series averaging 51.1 mm. The comparatively unicolorous tendency is the same as in the ♂; but obsolescence is less marked, although the spots are smaller than in normal specimens. The underside presents peculiarities similar to ♂♂ of this race.

Habitat: Creuddyn Peninsula, Carnarvonshire.

Types: ♂, ♀, 2nd July 1941, in my collection.

E. semele ssp. *thyone* flies earlier than is usual with other races, being on the wing towards the third week in June, and disappearing by the end of July.

**INTERSEXES IN A BROOD OF HYBRID *LYCIA HIRTARIA*, CLRCK.,
♂ × *POECILOPSIS LAPPONARIA*, BDV., ♀; HYBRID *WALLACEI*,
HARRISON.**

By E. A. COCKAYNE, D.M., F.R.C.P., F.R.E.S.

This hybrid has been bred on a number of occasions, but as far as I know the broods have consisted of approximately equal numbers of males and females, and the reverse hybrid has also produced both sexes. I do not think intersexes of either hybrid have been recorded. In 1942 Mr Alfred Hedges succeeded in obtaining a pairing between a male *Lycia hirtaria* from Kensington and a female *Poecilopsis lapponaria* from Struan. In 1943 he bred 23 ♂♂, 22 ♀♀, and 7 intersexes, and in

1944 he bred 3 ♂♂, and there are still 31 pupae lying over. The following is a description of the intersexes, all of which are much more like females than males.

- (1) Larger wings on the left side, partially pectinated antenna on the right side.
- (2) Larger wings on the right side, partially pectinated antenna on the right side.
- (3) Larger wings on the right side, partially pectinated antenna on the right side.
- (4) Wings on both sides larger than normal, but not so large on the left as on the right, partially pectinated antenna on the left side.
- (5) Large hindwings, partially pectinated antenna on the left side.
- (6) Wings as in a normal female, partially pectinated antenna on the left side.
- (7) All the wings squarer than normal, partially pectinated antenna on the right side.

In moths sex is determined by the balance between the X-chromosomes and the other chromosomes, the autosomes, two X-chromosomes producing a male and one X-chromosome a female. If, however, the X-chromosome has an abnormally high valency in proportion to that of the autosomes females may be transformed into males or intersexes, or males may greatly exceed females in number. For instance, in hybrid *L. hirtaria* ♂ × *Nyssia zonaria* ♀ the valency of the X-chromosome of *hirtaria* is so much greater than that of *zonaria* that all the females are transformed into males. As a rule the X-chromosomes of *L. hirtaria* and *P. lapponaria* are so nearly equal in valency that both their hybrids produce normal males and females. In this case, since the female receives its X-chromosome from the male parent, *hirtaria*, and its Y-chromosome from the female parent, *lapponaria*, the Kensington *hirtaria* must have had X-chromosomes of unusually high valency. Variation in the valency of the X-chromosome of *Lycia hirtaria* was demonstrated in 1919 by Harrison, who showed that the hybrid *pilzii* (*P. pomonaria* ♂ × *L. hirtaria* ♀ from England) gave an equal number of males and females, but with females from Scotland the ratio of males to females was 190 : 14, and a similar difference in sex ratio occurred when the hybrid *pilzii* was crossed with female *hirtaria* from England and Scotland respectively, the former cross giving approximately equal numbers of the two sexes and the latter a great preponderance of males. *Hirtaria* from the Continent resemble those from Scotland in valency, for Meisenheimer in 1917 bred 300 males and no females of the hybrid *pilzii* and in 1918 he bred 1000 males and only 6 females.

The variation in the valency of the X-chromosome of *hirtaria* demonstrated by Harrison and confirmed by Meisenheimer is racial, but in the male parent of this exceptional brood of *hirtaria* × *lapponaria* the high valency must have been individual.

In conclusion I wish to thank Mr Hedges for permission to publish the details of the brood.

CATKINS.

By AN OLD MOTH HUNTER.

"I really must bring my beating-tray up here to-morrow," said I to myself, gazing at a splendid sallow bush ablaze with yellow catkins. For although every year I vow that I have had enough of the *Xanthias* (as in the days of my youth we used to call *silago*, *flavago*, *lutea*, *cerago*, *fulvago* and *icteritia*—you can choose whichever names you prefer) I never tire of rearing the two lovely moths which result from a bag of catkins gathered at the right season. So the more I looked at this handsome bush the stronger became the old urge, and when presently I turned my steps homeward I had resolved to return with the beating-tray next day.

It is wiser, I think, to use a beating-tray for this particular method of obtaining larvae. I have an idea that the catkins inhabited by caterpillars are the first to fall—for the simple reason, I suppose, that the damage inflicted upon them by the larvae cause them to "die" sooner than catkins which are not attacked. So that if one spreads the tray, then gives the branch above it the very gentlest of taps, the catkins inhabited by larvae descend forthwith, the virgin catkins remaining on the bush. If on the other hand one snips off catkins at random with a pair of scissors one collects a great many catkins which do not contain anything at all.—Yet when visiting a bush a day or two after the first catkins have fallen I usually find larvae; so perhaps it is only laziness that induces me to use a beating-tray and my theory is but a plausible excuse . . . At all events I determined to visit that sallow bush again next day with my beating-tray and collect *Xanthia* larvae for the *n*-th time.

But next day I had a sharp attack of *dolce far niente*, and the day after that there were other things to do, and on the third day came a gale with torrents of rain. "That," said I, "is the end of the catkins; no *Xanthias* for me this year." It rained ceaselessly for three days, and the wind kept time with the rain. In a hill country *Carpe diem* is a motto that must be incessantly on one's lips.

This morning I awoke to find a warm west wind blowing lightly on my face and sunshine on the wall. So after breakfast I took the hill again, and an hour later stood in front of my sallow bush. What a change! Gone were the catkins, and as the young leaves were only just beginning to uncurl the bush looked much as it did three weeks ago. On the ground all round about it the catkins were thickly strewn, some fresh, but mostly grey and a few already turning to pulp. "I wonder . . ." said I to myself. "Anyhow, I may as well have a look." I threw my Burberry on the ground and, sitting down, picked up a catkin and carefully pinched off its top. Obvious signs of a larva. I pinched off a little more. A white backside appeared . . . I picked up another, and found that a *Xanthia* larva, actually at the end of its second stadium, a fine brown little fellow, was making a meal off its outside, eating, apparently, the green part close to the stalk; being too big to inhabit the catkin he was obliged to forage at large. At this I set to work with a will and presently I began to wish that I had formed two heaps, one of catkins which contained or had contained larvae, the

other devoid of inhabitants, and that I had counted the number in each heap; for I am sure that quite fifty per cent. showed signs of larval enterprise. In less than ten minutes two dozen *Xanthias* were in my box.

Then I began to ponder upon the philosophy of this matter. The ground beneath the bush, on three sides of it, was thickly covered with a dense matting of dead bracken, a matting of many years and so thick and heavy that no green plant could grow beneath it, let alone push its way through. It was only on the fourth side, where the ground was too swampy for bracken to grow, that there was greenery—devil's-bit scabious, dog-violet, trefoils, a sorrel or two. How could the hundreds of larvae—for it was a ten-foot bush and must have borne well over a thousand catkins, possibly several thousand—ever hope to reach green food before starvation overtook them? The answer, I take it, is that they had no chance at all of doing so. They would just perish among the pulping catkins. Perhaps not fifty larvae would ever find green food. How immense the wastage must be!

These two Sallow moths (the Sallow and the Pink-barred Sallow) never seem to revisit the bush on which they were born; for I have paid much heed to sallows ever since that day in early boyhood when I found my first *S. ocellatus* thereon; and not yet have I taken the larva of either species on this shrub when full grown. The parent moth lays two, three, or four eggs (easily found in winter-time) between twig and bud, and the emergent larvae eat their way forthwith into the catkin, and there they remain until, like parachutists, they come safely to earth. Judging by my experience to-day, they continue to eat the catkin so long as it remains edible, then crawl out and go to the nearest herbaceous plant. If, like the second stadium one which I have just taken, they are unable to find a suitable plant, they eat the green parts of any other catkins handy. And when they can find no more green catkins nor any plants in the dense jungle of matted brake? . . . There must be many that meet with this fate. Yet in confinement they retain their early taste for sallow and I have often reared them to maturity on no other food. But sallow is not easy to keep fresh in a larva cage, so I shall feed my bag of to-day with hawthorn, which they accept without demur.

A. lota and *B. viminalis* and *Z. retusa* are much wiser. They have discovered a method of finding out just when their catkin is going to fall, and as soon as the red light appears they leave the nursery and go to the nearest leaf-bud. Into this they crawl, spin together the rapidly expanding leaves, and live secure from the prying eyes of ichneumons and other predatory Hymenoptera and Diptera. Yet, like all of us, they have their enemies, and sometimes—indeed, very often, I am afraid—a sneaking hemipteron or earwig or suchlike marauder, as hateful to the lepidopterist as it is to the larva, forces a way in between the spun-together leaves . . . A vicious snap of the jaws (oh, I don't a bit mind using hyperbole where earwigs are concerned; no attribution of vice can be too far-fetched for such an infamous beast), and other good larva has gone west.

Retusa can be rather a nuisance when one is searching for *viminalis* in hope of breeding "vars." One afternoon last year I snipped off forty-five spun-together leaves from sallows on the river bank, and bred

forty-one *Z. retusa*. But this was entirely my fault; the larvae of *retusa* and *viminalis* are easy to distinguish: both are green, but *viminalis* has two pairs of whitish dots on the back of each somite, a form of adornment which *retusa* scorns. *Lota's* larva, of course, is brown (distinguishable from the Sallows by the broken whitish dorsal line), and the Geometers which lie flat—and can easily be mistaken, when very young, for either *retusa* or *viminalis*—will always declare their nationality when gently prodded in the rear with a blade of grass.

The swallow catkins, of course, are now "over" everywhere; but the second and third weeks in June are likely to yield *retusa* and *viminalis* in most parts of the Kingdom. *Retusa* is said to be "local," but perhaps this is only because he is so easily overlooked.

TERMINOLOGY IN NATURAL SCIENCE.

I. In my Notes appearing in the *Ent. Record*, which are intended mainly to collect what is known of the variation of our British Noctuae, I have used the terms "race" and "subspecies" to register the two grades of varied and aberrant development under the species before me. It is well understood that a species scatters itself into areas, near and far from its original localities thus forming colonies. These colonies naturally will come under diverse natural conditions, some advantageous to growth and development, some not so well situated. A more or less isolated colony soon develops a tendency to respond to its surroundings and attains some fresh character usually in a very sporadic number of its members. If this newly acquired feature be successful in surviving its hard struggle among the rest of the members of the colony it may be noted in course of time by a nature student, who may call this colony a "race" since it is differentiated by having among its constituents a few individuals of a recognizable different facies from the nominotypical forms which make up the particular colony. Such a colony is what is called a "race."

In course of time, it might happen, and apparently has happened in numerous colonies, that the new features have become practically universal in the colony, and that the nominotypical form is in comparatively small number. The "race" has now evolved into that status which we have been in the habit of calling a "subspecies."

Here, in fact, one seems to envisage the evolution of what may eventually be docketed as a species.—HY. J. T.

II. In 1898 Geddes and Thompson wrote a work entitled *The Evolution of Sex*, a wonderful collection of facts, but in many respects a "witness of science to linguistic anarchy." A short chapter deals with "Hermaphroditism," which may serve to illustrate the above remark. On page 80 they sum up their study and give this excellent definition: "Hermaphroditism is the union of the two sexual functions in one organism." This expression is definitely definite on "functions," i.e., not the sexual structures alone, but the functions of those organs must be competent to carry out their functional activity, both male and female, in the same organism. But this is immediately followed by an extraordinary remark, an absolutely illogical remark, an impossible condi-

tion of hermaphroditism to be included in the definition: "*This occurs, however, in varying degrees.*" The structures must be perfect for the function to be carried on as demanded by the definition, for an organism to be hermaphrodite, and the functions must be perfectly capable of carrying on. Any degree of failure in structure or in function in an organism and it can no longer be called hermaphrodite. There can be no degree, if the definition is to stand.

Forty years have passed since the "linguistic anarchy" of the expression of "hermaphroditism in varying degree" was made, and it is recognized that all the imperfect examples as regards either structures or functions both "internal" and "superficial" are forms which in appearance simulate only a portion of the two sexual structures (inside) or dimorphic colour, etc. (superficial, sexual), and a modern term has been applied to them—"gynandromorph." I am not aware that any example of absolute hermaphroditism has been proved in the Lepidoptera, but at least superficial gynandromorphs are by no means uncommon.

In the same chapter the two authors give an example of "A beautiful case of intimate blending of superficial sex characters was lately shown to us by Mr W. de V. Kane of Kingsdown. A specimen of butterfly (*Euchloë euphenoides*) showed the anterior half of the forewings and part of the hindwings with the characteristic white ground of the female, while in the posterior half of the forewings and on most of the hindwings the characteristic sulphur of the male prevailed. In other minor ways, the characteristics of the two sexes are well marked, were intimately blended. Similar cases are on record."

They go on to discuss the cases in all orders, which they include under the terms hermaphroditism of "varying degree." But after giving a few examples of more or less "partial hermaphroditism" so called, remark that it is enough to note the very wide occurrence of such cases. The authors divide these so called "partial" hermaphrodite cases into an internal section as ascertained by dissection, and "superficial hermaphroditism." Not one example in either of these sections fulfils or can be expected to fulfil the functions expressed in the original definition of hermaphroditism as stated above. Of this section where the indications are noted as "superficial" they remark as follows:—"The prettiest cases of superficial hermaphroditism occur among insects, especially among moths and butterflies, where it often happens that the wings on one side are those of the male, on the other those of the female. Only the external features have been observed in most cases, but it has been shown by dissection that such superficial blending may exist along with internal sexuality, or, in a few cases, with genuine internal hermaphroditism."

Thus in this case time has brought about a more correct appreciation of the biologic facts without "linguistic anarchy."—Hy. J. T.

COLLECTING NOTES.

FOODPLANTS OF ALLOPHYTES (*MISELIA*) OXYACANTHAE, L.—One usually associates the larva of this species with Hawthorn and Blackthorn; occasionally one is found on Crab Apple. To-day (5th June) I beat a

full grown larva from Cherry, *Prunus cerasus*, L. The tree was thickly lichenized and the larva was the grey form, as were those recently collected from old Crab trees.—P. B. M. ALLAN.

CHILOSIA ALBIPILA, MG. (DIPTERA, SYRPHIDAE) BRED.—In the September '43 issue of this magazine Captain R. D. Troup, in the course of a note on "The Foodplant of *Ochria ochracea*," referred to finding dipterous larvae in the stems of the Marsh Thistle (*C. palustris*) at Alton Pancras, Dorset, and in response to a letter he kindly sent me some stems with about 20 larvae. I put these in a cardboard box with some earth and hung up the box out of doors with overhead cover but otherwise in the open. Early in March of this year I brought the box indoors to an upstairs room without heat, and between the 17th and 20th, although the weather was cold with morning frosts, 4 ♂♂ and 1 ♀ of *C. albipila* emerged. This fly is not uncommon; it is an early spring species—Verrall's dates are 24th March to 27th April—but I can find no note of its having been "bred" in this country, so think it worth recording.

The larvae of *Chilosia* generally appear to be internal feeders in stems and roots with a few leaf-miners, and usually to pupate in the earth. Lundbeck (in *Diptera Danica*, Vol. 5) records several species that also occur in Britain as having been bred from truffles and other fungi, several species of thistles, and camomile; but the only British breeding record I have been able to find is a note by Mr J. C. F. Fryer in *E.M.M.*, Vol. 51, p. 194 (June 1915), in which he records *C. variabilis*, Pz., as being bred from roots of figwort (*S. nodosa*), and refers to an Irish record, *C. sparsa*, Lw., bred from roots of primrose.

The fact that I bred only 5 specimens from some 20 larvae looks as if they got too dry; from Captain Troup's letter I gathered that the larvae came from a swampy locality.—H. W. ANDREWS.

CURRENT NOTES.

THE present number will be our issue for June and July. The next number will be the August-September. We are urged to "save paper" but we are influenced also by the unusual (for us) paucity of notes and short articles. Will our readers please note. Every one has some item he can send us. Will he please forward it. If it necessitates a figure, we hope that the scheme referred to below will satisfy that necessity ere long.

THE cost of plates has gone up recently by "leaps and bounds" to such a degree that the advancement of knowledge and research is terribly handicapped. A scheme is in consideration by which the cost to an individual will be much less, in fact, may be, in most instances, quite reasonable when compared with the current price of a block. But it will require the careful help of the subscribers to our magazine. Particulars will be given in a future number when the scheme is further advanced. Of course, if any of our subscribers have suggestions as to how our object can be forwarded we shall be only too pleased to consider them.

ENTOMOLOGICAL ARTISTS.—Mr S. G. Castle Russell's note on p. 38 (your March number of this year) greatly interested me. May I venture to mention a modern entomological artist of the very first calibre, who, I feel sure, will not suffer by comparison with the "old time artist," William Buckler? I refer to Monsieur Le Cerf of the Museum National d'Histoire Naturelle, Paris. Besides being an artist, M. Le Cerf is also an eminent taxonomist, being the greatest authority, in Europe at least, on the *Sesiidae*, *Cossidae*, *Micropterygidae*, and, I believe, some other families. His paintings are so fine that they stand examination under a lens! I fancy this combination of talents must be unique.—E. P. WILTSHIRE, Basra, 14/4/44.

FOR some years past in each season a large number of records of the Mass Movement, or Immigration, of Insects has been recorded, but these records are all deficient in the one detail, the origin of the movement. There has been one such record, long long ago. In *Nature*, 1879, p. 266, S. B. J. Skertchley reported the mass emergence of *Vanessa cardui* at W. Sawakin, from whence the migration started. With so many lepidopterists now serving abroad opportunities may occur of recording similar occurrences. Our entomological magazines and Captain Dannreuther, the Secretary of the Insect Committee of the S.E. Union of Scientific Societies, would welcome such in their pages. Herewith is a special appeal we have just received:

Request for Entomologists serving abroad to observe Migrant Insects.—The Insect Immigration Committee is anxious to trace to their source the swarms of insects recorded from time to time as arriving in the British Isles. Dates of emergence, estimated numbers, flight direction and climatic conditions prevailing at the time are wanted, also details of local foodplants, habits, etc. Entomologists serving abroad and having opportunities for observation are urged to send records of any apparent migration to the Keeper of Entomology at the British Museum (Natural History), London, S.W.7, or direct to the undersigned.—Capt. T. DANNREUTHER, R.N., F.R.E.S., "Windycroft," Hastings, Sussex, April 28th, 1944.

THE WHITEHOUSE COLLECTION SALE.—On p. 34 of the current volume (March 1944) you mention the sale for ten guineas of a gynandromorph *paphia* "taken at Lyndhurst in 1900 by E. Wiltshire." Since my name has been frequently mentioned in your pages of late, may I ask you to make clear to your readers that I have never caught a gynandromorph *paphia* in my life, have never taken this butterfly in the New Forest region, and that the date given was ten years before I was born.

Since you also state that the specimen was exhibited at the South London Society in 1900 (by which presumably the Society which is now titled the South London Entomological and Nat. Hist. Society is meant), doubtless that Society's Secretary will be able after reference to the records to give further details about the exhibit and captor. I shall be most interested to learn more of my namesake, since I was quite unaware that an entomologist with exactly my own name and first initial had been active in England this century, or any other century for that matter. I therefore look forward to the publication in your pages of further details in this regard.—E. P. WILTSHIRE, Basra, 14/ix/44.

Rott., *Naturg.*, IX, 135 (1776), said *dubia*, Hufn., was *lucipara*, L.

Esp., *Abbild.*, IV (2), 659, plt. 174, 1-2 (1791+?), gave two figures, very dark, like most of the Continental figures, but quite recognizable when looked into critically.

Ernst & Enggram., *Pap. d'Eur.*, VII, p. 118, fig. 491c, d, e (1790), gave three figures, all of which were of the Linnaean typical dark form.

Hb., *Text.*, 176 (1805?), described *lucipara* as "eischwarz," and emphasized the dark coloration throughout the yellow leaden grey, the centred reniform and pale waved line being the only light markings given.

Hb., *Samml. Noct.*, 55 (1800-3), is not a typical figure. It is much too red, the reniform has no white about it, on the inner side of the inner transverse line is an area of deep blackish-red from the middle of the wing to the inner margin, the area outside the outer line is not conspicuously lighter.

Hb., *Verz.*, 217 (1821), placed *lucipara* in the genus *Trigonophora* with *meticulosa*, *empyrea*, *scita*, etc.

Treit., *Schmettt.*, V (1), 377 (1825), gave references to Hufn., *Berl. Mag.*, III, 404, 1766, *dubia*, and Rott., *Naturg.*, IX, 155 (1776), *dubia* as being this species. Also Fab., *Mant.*, II, 117, *flavomaculatá*, as this species. Of this last Treit. said in a footnote, "The Fab. description in the *Mantissa* is more correct than that in the *Ent. Sys.* that one must suppose that in the latter he did not have before him the true *lucipara*."

Dup., *Hist. Nat.*, VI, 348, plt. 94, 5 (1826), gave an excellent, but very dark, figure, the inner half of the subterminal area and the outer part of the basal area being of a deep russet tinge, while the reniform was slightly of the same colour.

Freyer, *N. Beitr.*, I, 150, plt. 82 (1833), gave a very dark recognizable figure. He refers to the "true" figures in Knoch's *Beitrage*, II, plt. 1, 6, 7 (1783).

H.-S., *Sys. Bearb.*, II, 277 (1850), said Hb. 55 was too dark and the forewing ♂ was too stumpy. Of Freyer, *N. Beitr.*, f. 82 was poorer than that of Hb.

Barrett, *l.c.*, plt. 190, gave two good figures.

Meyrick, *Handbk.*, 128 (1895), used the genus *Hadena* in both editions (1928), 81.

Splr., *Schmettt. Eur.*, I, 211, plt. 41, 25, ♂ (1906). The author said that the "forewings in the figure were too red and that the abdomen was too long." "The average examples are much more varied in colour and marking."

South, *M.B.I.*, I., 291, plt. 141, 5 (1907), gave a good figure of our average British examples.

Warr.-Stz., *Pal. Noct.*, III, 188 (1911), gave two figures, plt. 43i, ♂ and ♀, with only a shade difference in ground colour. They noted that "Japanese examples were somewhat larger, the ground colour darker, more suffused with purple."

Culot, *N. et G.*, I (1), 202, plt. 37, 7 (1913), gave a good figure of a dark reddish-brown, but little varied with dark hindwing. He said it varied but little between "reddish-brown and blackish-violet."

Drdt.-Stz., *Pal. Noct. Supp.*, III, 169 (1934), included two forms, *leonhardi*, Rbl., and *exotica*, Strnd. (Hamp.).

Smith, *Cat. Noct. N. Am.*, 171 (1893), and Dyar, *Cat.* Both these refer to *lucipara* as a N. American species.

Holland, *The Moth Book*, 172, plt. 20, 26 (1903), gave a very dark figure, the marginal area being scarcely differentiated from the very dark black central fascia.

Drdt.-Seitz, *Am. Noct.*, VII, 213 (1925), has accepted the genitalic determination of the *lucipara* of America as a separate species with the name *benesimilis*, McD. Apparently from the figure given in Seitz there appears to be no appreciable outer specific differentiation from our Continental forms (plt. 31i). In fact the figure given looks much more like a varied British specimen. [The genitalia are different.—Dr E. A. C.]

The Forms and Names to be considered:

lucipara, L. (1758), *Sys. Nat.*, Xed., 518.

dubia, Hufn. (1766), *Berl. Mag.*, III, 404, Syn.

flavomaculata, Fab. (1787), *Mant.*, II, 127, Syn.

ssp. *leonhardi*, Reb. (1909), *Verh. z.-b. Ges. Wien*, 331, fig. 2.

ssp. *exotica*, (Hamp.), Strnd. (1908), 1915 (*Lep. Phal.* VII, 241):

Naturl., LXXXI, 153, *Abt. A*, Heft. 11.

ssp. *britannica*, nov. ssp.

ab. *conspicua*, nov. ab.

Tutt dealt with the typical form only.

Although no mention is made in the text of Seitz of difference between the ♂ and ♀ of *lucipara*, the figures on plate 43i show the reniform in the ♀ large and of a purer white, the double line is succeeded by a parallel area nearly as light ochreous as the filling of the double transverse line; this is succeeded by the dark purple-brown marginal area. In the ♂ the two latter features are reversed, the narrow area next to the light transverse double line is dark purple-brown, and the wide dark marginal area is lightened by a very irregular ochreous narrow line. The hindwing of the male has a very distinct light ochreous band running through the dark marginal area but not reaching the apical angle. The transverse lines mentioned seem to open out before reaching the costa of the forewing.

The figure given by Hampson, *Lep. Phal.*, VII, 240, f. 35, does not appear to be our *lucipara*. There is a definite and conspicuous white blotch towards the apex quite as strong as the reniform stigma, a feature I have never seen in any specimen. Some examples have several whitish striae near the apex of the wing. The reniform too is farther removed from the double transverse line area. The marking of the hindwings are not like those in average *lucipara*.

ssp. *exotica*, Strand., *Arch. Natg.*, LXXXI, 153, *Abt. A*, Heft. 11 (1915). Hamps., *Lep. Phal.*, VII, 241 (1908), no name, see Strand.

ORIG. DESCIP.—Hamps., "The Oriental and American forms have the post medial area of the forewings more purplish and less rufous than the typical European form."

subsp. *leonhardi*, Reb. (*Verh. z.-b. Ges. W.*, LIX, 331, fig. 2) (1909), *Nov. Zool.*, XXVII, 56 (1920). "A darker, duskier local subspecies, but the pattern differences given by the author are not confirmed in my series of 129 specimens." Algeria.

f. *leonhardhi*, Rb., *Verh. z.-b. Ges. Wien* (1909), 331.

FIG.—*l.c.*, f. 2, ♀.

ORIG. DESCRIP.—“The general colour is a more uniform, dusky, purple-brown while the pale centre of the reniform of the forewing is much more covered with brown, the yellow suffusion of the outer band is completely wanting, the dark central area is much straighter bordered and has the form of a triangle with the apex on the inner margin, whereas in *lucipara* the portion on the inner margin appears indented on both sides. Also the hindwings are on both sides distinctly darker, without trace of the yellowish suffusion towards the base often so distinctly prominent in *lucipara*.” Treated as a species at first.

Drdt., *Pal. Noct. Supp.*, III, 169 (1934), said “the differences in the markings mentioned by Rebel are not constant. Some specimens are exceedingly dusky.” Algeria and Tunis. The figure *l.c.*, plt. 20h, is of a very small specimen.

After the study of the descriptions of all the more important and reliable authors from Linné onwards, and the inspection of a considerable number of coloured figures from the same period, it seems that the altogether lighter and more varied colour and marking of our British specimens points to the latter as a distinct race. This opinion is confirmed by the few Continental examples I have been able to examine. Curiously this opinion is confirmed by the figures in Seitz work, which are of the varied in colour and marking of the British race [the Noctuid volume was written and illustrated by the English author, Warren]. The hindwings are light brownish-grey becoming darker on the outer margin, and very occasionally even blackish.

To register this distinction I suggest that we designate our island form by the name *britannica*, nov. subsp.

ssp. *britannica*, nov. ssp.

DESCRIPTION.—The general coloration and marking lighter and more varied than these features in the normal typical forms on the Continent. The reniform white with only a faint tinge or marking in brown. The marginal area lighter than any other especially the inner half which may be a glossy light brown in part suggesting white infusion, and may unite or almost unite with the reniform. A thin brown waved line can generally be seen, running down the centre of this lighter half from costa to inner margin. The dark central fascia is somewhat varied in depth of colour and the contained orbicular may be slightly more visible. The outer half of the subterminal area is subject to much variation and variation in the incidence of light loses its dark appearance to light glossy brown. This half contains the subterminal line, if present (it maybe reduced to dots). In one very beautiful example sent me by Capt. C. Q. Parsons of Torquay this is a dark blackish-red-brown line bordered on the outside by fine light brown. This specimen is remarkable in having in the upper costal portion three very clear white spots; it also has a large more conspicuously light reniform. It might perhaps be called *conspicua*, nov. ab.

Aplecta, Gn. (1841-1852), Dup., Tutt. [*Polia*, Hb. (1806), *Tent*, Och. & Treit. (1816-25), Frr.: *Agrotis*, Ochs. & Tr. (1816-25), *Stdgr.*, *Splrr.*,

Culot: *Triphaena*, Ochs. & Treit. (1816-25), Meyr., Meyr.: *Polia*, Ochs. & Treit., see above: *Eurois*, Hb. (1821), Barr., Hamps., South, Warr.-Stz., Drdt.-Stz.: *Polyphaenis*, Bdv. (1840), Gn. in pt. (1852)].

[The American ssp.: *Matuta*, Grt. (1890?), Brns. & McD.: *Adelphagrotis*, Smith (1890), Dyar-Beut., Holl.] *prasina*, (Fb.), Schiff. (teste Hb.-Gey.).

Tutt, *Brit. Noct.*, III, 65 (1892): Meyr., *Handb.*, 108 (1895): Barr., *Lep. Br. Is.*, IV, 104, plt. 149, 1 (1897): Stdgr., *Cat.*, II, 153 (1901): Hamps., *Lep. Phal.*, IV, 617, fig. 110 (1903): Splr., *Schm. Eur.*, I, 164, plt. 36, 1 (1905): South, *M.B.I.*, I, 235, plt. 117, 1 (1907): Culot, *N. et G.*, I (1), 92, plt. 15, 18 (1909): Warr.-Stz., *Pal. Noct.*, III, 60, plt. 14a (1909); Meyr., *Rev. Hand.*, 113 (1928): Drdt.-Stz., *Pal. Noct. Supp.*, III, 87 (1933).

Ernst & Engram., *Pap. d'Eur.*, VII, 83, fig. 465 a, c, d (1790), gave three figures of this species under the name *prasina*, all very good. They referred to the figure of Esper's, *egregia*, plt. 119, and said that the description had not yet appeared (1790).

Schiff., *Verz.*, 82, O., 11 (1775), was the first author to use this name. There was no description. In the Appendix, *l.c.*, p. 313, he introduced another species (or name), *herbida*.

Illiger, *Ansg. Verz.*, I, 274 (1801), gave the description from Fab., *Ent. Sys.*, III, 2 (1794). Tutt quoted from the *Mantissa*, II, 169 (1787). Illiger discussed the *prasina* and *herbida* of the *Verz.*, and he stated that the latter might be a variety of the former while Borkhausen had suggested it might be his *jaspidea*.

Götze, *Beitrag*, III (3), 250 (1781), took the unnamed figure and description in De Geer, *Ins.*, II (1), p. 412, plt. 6, f. 24, and gave it the name *viridi-obscura*, "the dark green Noctua," which is *prasina-herbida*.

Wernb., I, 190, said the figure somewhat resembled *herbida* but the description was that of *polymita*.

Esp., *Abbild.*, IV, 297, plt. 119, 7 (1789+?) and [IV (2), 2, p. 28, plt. 188 (L. & P.)] figured this species under the name *egregia*. The figure is recognizable, but without any trace of green. Although Esp. bred it from a larva he did not mention green, but said the f.w. were dark red-brown. However he reported a specimen from near Innsbruck, which was a deep green. Yet he called it in the title of the chapter ("The greenish white-spotted Noctua"). Later he referred to the loss of the green colour which took place in a short period.

Bork., *Naturg.*, IV, 440 (1792), described this species under the name *jaspidea*; he said it was probably the *herbida* of the *Verz.* of Schiff., and that it certainly was not the *jaspidea* of de Vill. (*Ent. Linn.*, II, 284, plt. 6, 28) (1789), which is undoubtedly *oleagina*.

Hb., *Samml. Noct.*, 76 (1802), figured an insect under the name *herbida*, which is considered to be a figure of the typical form. It is darker than any of our British *prasina* but has the same display of marking. The Continental Austrian, Vienna specimens I have, agree with it, of course minus the delicate green. His further figure 505 (1809-13) has the green of quite another shade, very heavy without trace of the beautiful delicacy of the true shade of green. In the *Text*, Hb.-Gey. (1834) gave 76 ♀ and 505 ♂ and said that it **was** the *prasina* of the *Verz.* Schiff.

and that *egregia*, Esp., and *jaspidea*, Bork., were synonyms. Thus *prasina*, Schiff., is the prior name and author, used by recent authors.

herbida, Hb., *Samml. Noct.*, *Text*, Hb.-Geyer, p. 190 (1834+).

ORIG. DESCRIP.—“Pale green; head and thorax brown, green suffused and black marked; the wing mottled with brown, green and whitish with blackish waved streaking.”

Haw., *Lep. Brit.*, II, 157 (1809), describes a species under the name *mixta*, which he said he thought was a “faded specimen and that the tawny marking should be green;” the description of the design seems to point to *prasina* of which it has been considered a synonym. Haw. called it the “Green Arches.”

Comparison of the Continental and British usual forms seem to show such a decided difference in general appearance that we must, I think, consider Haworth's *mixta* as the name of a subspecies.

Tr., *Schm.*, V (2), 56 (1825), under the name *herbida* described this “brown and green” species. He said it was the *prasina*, Schiff., the *herbida*, Schiff., the *egregia*, Esp., the *jaspidea*, Bork., and the *viridiobscura*, Götze, as well as the *tullia*, Cram. (*Pap. exot.*, IV, 242, plt. 400, E.).

Dup., *Hist. Nat.*, VI, 395, plt. 97, f. 3 (1826), described this species under the name *herbida*, Hb., but said it was the same as *prasina*, Schiff. The figure was not good; there was no variegated marking, but the transverse lines were very emphasized white, the central band was very plain; all other marking was obscure. Green was completely wanting, although the description featured the colour quite well.

Steph., *Ill.*, III, 30, plt. 27, 3 (1829), gave a rather remarkable figure in which the contrast is emphasized between the predominance of light grey-green and the depth of the black mass around the stigmata except just at the top. The scattered black marking is very thin and scrappy except the submarginal line which is irregular but complete. There is a white narrow space just below the costal markings extending almost the length of the wing. He took his series at Darent.

Frr., *Beitr.*, I, 131, plt. xl (1828), gave a figure of *herbida* which showed a fair amount of heavy green. The well-known white blotch was made up of three squares—white, green, white. It was not a good figure. The white costal area is not expressed as it normally is in Britain or in the Continent.

Gn., *Hist. Nat.*, VI (2), *Noct.* (1852), p. 73, pointed out that Schiff., *Verz.*, made two species of this Noctua, in spite of there being no differences. He called it *herbida*. He said it was *egregia*, Esp., *mixta*, Haw., *prasina*, Schiff., *jaspidea*, Bork., and was found in America.

Barrett gave five very varied figures on plate 149. Fig. 1d is supposed to represent the specimen recorded by Barrett as costal half green, dorsal half reddish-yellow, which it certainly does not.

Stdgr., *Cat.*, IIIed., 153 (1901), placed *prasina*, Fb. (*Mant.*), almost last in his extensive genus *Agrotis*, and treated *herbida*, Hb., *egregia*, Esp., and *albimacula*, Hormuz., as synonyms, without including any forms.

Hamp., *Lep. Phal.*, IV, 617, f. 110 (1903), gave a good b. and w. figure, and used the name *prasina*, Schiff., as the prior, placing Fab., *Mantissa*, II, 169, next. He gave no aberrant forms, but included *egregia*, Esp., *jaspidea*, Bork., *mixta*, Haw., *herbacea*, Gn., and *albi-*

macula, Hormuz., as synonyms. Among his localities he placed Canada, New York, Colorado, etc., Amur., Siberia and Japan.

H.-S., *Sys. Bearb.*, II, 263 (1850), said that H. 76 was not a good figure, 505 was better. He used the name *herbida*, Schiff., which was the same as *prasina*, Fb., and *egregia*, Esp.; *jaspidea*, Bork., was a var.

South, *M.B.I.*, I, 235, plt. 117, 1-2 (1907), gave two very good figures of the British subspecific form, with all the original green turned to yellow-brown, but the markings are quite characteristic of the species. In fact the work of South (with whom I occasionally collected half a century ago) was excellent as can be judged from the standard edition of 1907 quoted here.

Warr.-Stz., *Pal. Noct.*, III, 60, plt. 14a (1909), dealt with five forms *jaspidea*, Bork., *pallida*, Tutt, *suffusa*, Tutt, *albimacula*, Hormuz., and *lugubris*, Petersen, and figured only the typical form. As synonyms they considered *herbida*, Hb., *egregia*, Esp., *mixta*, Haw., and *herbacea*, Gn. Their figure was rather too brown, compared with English examples, but probably represents the usual Continental form of which I possess a short series mainly from Lower Austria.

Culot, *N. et G.*, I (1), 92, plt. 15, f. 15 (1909), gave what, at first glance, appears to be an inferior figure for him. All the mottling is there but much obscured in the dark olive-brown to which the original green has changed. The usual marking is there, even the dark portion of the central band can be seen, but obscured. The usual light bands are absent except just on the costa.

Drdt.-Stz., *Pal. Noct. Supp.*, III, 87 (1933), recorded five fresh forms: *vividior*, Splr., *olivacea*, Lenz., *obscura*, Lenz., *vittata*, Heinr., and *medio-nigra*, Lenz. They have the opinion that the last two are "probably much the same."

Beutenmüller, *Bull. Amer. Mus. N.H.*, XIV, 266, plt. xxxvii, f. 8 (1901), gave a very good b. and w. figure of the New York State Noctuid, *Adelphagrotis prasina*, Fb., "a large mossy-green species of *Noctua*." The figure agrees with our species completely.

Smith, *Cat. of Noctuidae of Boreal America*, p. 57 (1893), included *Adelphagrotis prasina*, Fb.

Holland, *The Moth Book* (Amer.), gave a very fair figure of the N. American form, plt. xxi, f. 24, and referred to it (p. 179) as being very common all over Canada and the northern part of the United States.

Barnes & McDunnough, *Check List*, 48, No. 1560 (1917), included *prasina* in the genus *Matuta*.

Barrett's Remarks on the Variation:

Not very variable, though the broad spaces of dark clouding toward the base, in the central area, and behind are sometimes more or less pale, and the surface consequently greener, till in some instances the green wing is only rippled with dark lines. But it is often difficult to decide the original shade of colour in a specimen which has been more than a few months in the cabinet, since fading commences very soon after death, first to paler green then to yellowish, until at times the whole of the green surface has become yellow, or even in some parts pale orange. In South Yorkshire a handsome local race has the black mar-

bling greatly intensified, the broad central band becoming especially black and nearly obliterating the stigmata. In the New Forest, Hants, the tendency seems to be towards exceptional paleness, and Mr S. J. Capper possesses a specimen from that locality, which, except the central band, is almost greenish-white. Among the Yorkshire forms are singular aberrations; one in the collection of Mr G. T. Porritt has the costal half of the forewings green, the dorsal half reddish-yellow with the usual dark markings. Dr H. H. Corbett has one with a large white blotch on the reniform stigma; another with a similar white blotch on the orbicular.

The Names and Forms to be considered :

- prasina*, Schiff. (1775), *Verz.*, 82, O., 11.
f. herbida, Schiff. (1775), *Verz. Appen.*, 313, O., 22 (10, 11).
syn. viridi-obscura, Götze (1781), *Beitr.*, III (3), 250.
syn. prasina, Fb. (1787), *Mantissa*, II, 169.
syn. egregia, Esp. (1789+?), *Abbild.*, IV, 297, plt. 119, 7.
syn. jaspidea, Bork. (1792), *Naturg.*, IV, 440.
f. herbida, Hb. (1802), *Samml. Noct.*, 76, 505.
ssp. mixta, Haw. (1809), *Lep. Brit.*, II, 157.
ssp. herbacea, Gn. (1852), *Hist. Nat.*, VI, 73.
ab. pallida, Tutt (1892), *Brit. Noct.*, III, 65.
ab. suffusa, Tutt (1892), *l.c.*
ab. albimacula, Hormuz. (1894), *Ent. Nach.*, 52.
ab. lugubris, Petersen (1902), *Beitr. Lep. Fn. Eston.*, 69.
ab. viridior, Splr. (1905), *Schmet. Eur.*, I, 164.
ab. vittata, Heinr. (1916), *Deut. ent. Zt.*, 514, plt. 4, 10.
ab. obscura, Lenz. (1917), *Oest. Schmet. Sudbay.*, II (2), 252, plt. xiv, 8.
ab. olivacea, Lenz., *l.c.*, f. 4.
ab. medionigra, Lenz., *l.c.*, figs. 2, 6, 7.

Tutt dealt with: (1) The typical green form; (2) *ab. suffusa*, a very rare reddish-brown form; (3) *f. jaspidea*, Bork., green mixed with dark grey, with whitish lines; (4) *ab. pallida*.

viridi-obscura, Götze, *Beitr.*, III (3), 250 (1781).

ORIG. DESCRIP.—[Ex De Geer, *Ins.*, II (1), 412, plt. 6, f. 24 (1771?)]
 “Phalene verte obscure à rayes blanches et noires. Phalene à antennes filiformes, à trompe, à ailes rabutues d'un brun verdâtre avec des rayes ondées blanches et noires, et deux taches blancheatres au milieu.” No doubt it was the *prasina-herbida*, as subsequently named by Schiff.

f. mixta, Haw., *Lep. Brit.*, 187 (1809).

ORIG. DESCRIP.—“Alae antice pallide cinereo-fulvicantes, striga basi nigra, secunda ante medium, quae exserit macula ordinariam claviformem. Tertia striga geminata vix pone medium posita est. Inter ultimas strigas stigmata ordinaria nigro margine solum conspicua. Pone haec, macula majuscula, pallidior. Juxta marginem posticum striga undata pallida fere oblitteratae, intus adnata punctis nigris trigonis subtribus costam versus. Posticae alae fusco-fulvicantes fimbria fuscâ, ciliis subfulvis.”

Note:—“I conceive the above described to be a faded specimen, and that its tawny markings once were green.”

“*Syn. herbida*, Hb. 76 ?”

herbacea, Gn., *Hist. Nat.*, VI, 73 (1852).

ORIG. DESCRIP.—“Forewings of a handsome pistachio green; with black markings, the median lines waved, doubled; the subterminal visible only at the top, and joining a black waved line, lower down, which seems to continue it, and which ends at $2/3$ across the wing. The median space is partly confined by the black ground, upon which the stigmata are displayed, also in black. Hindwings of a reddish-coppery-brown with a subterminal band succeeded by a line, black; below, they are of a reddish-clay-yellow, with a large cellular lunule—two lines below.” N. America.

herbida, Gn., *Hist. Nat.*, VI, 75 (1852).

ORIG. DESCRIP.—“It differs chiefly from it, that there is white in four places on the forewings, in place of one alone which occurs in the type behind the ordinary stigmata.”

He refers it to *prasina*, Bork.; *egregia*, Esp.

f. albimacula, Hormuz., *Ent. Nachr.*, 52 (1894).

ORIG. DESCRIP.—“On the forewing the ground colour is pale grey, not as in German examples, outstanding pale brown, by which the green coloration becomes strongly curtailed. This colour is confined to a few longitudinal streaks less bright and pale, of which that on the under half of the median vein is most apparent; at the base, towards the costa and outer margin the green colour becomes obsolescent in a few less prominent spots, so that, on the whole, the forewing appears more grey than green. In a specimen from Brussa the middle area and the border between the orbicular and reniform are intense black-brown. The sharply defined spot on the outside of the reniform is very striking and bright white without green suffusion, just as the interior of the first (nearest the base) cross line, which is in particular characteristic of this local race. Head and terminal joint of palpi whitish-grey, not green suffused, the thorax somewhat darker, with black-greenish-yellow suffusion, but the grey dominant as are the petagia.” Bukowina.

ab. lugubris, Ptrsn., *Lep. Fen. v. Est.*, p. 69 (1902).

ORIG. DESCRIP.—“Obscurior al. ant. haud albo stignatis nec viridescentibus.”

“Ground colour (uniformly) generally dark brown-grey, in which the greenish and whitish markings are scarcely to be noticed slightly, so that the specimen gives a wholly unfamiliar impression.” Estland.

ab. viridior, Splr., *Schmett. Eur.*, I, 164 (1905).

ORIG. DESCRIP.—“Mostly with yellow-green, rarely with soft green.”

ab. vittata, Heinr., *Deutsch. ent. Zt.*, 514, (1914).

FIG.—*l.c.*, plt. iv, 10.

ORIG. DESCRIP.—“The area between the middle and outer transverse lines darkened unicolorous black-green, forms a sharply margined distinct band.” Berlin.

ab. obscura, Lenz., *Oest. Schm. Sudbay.*, II (2), 252 (1917).

FIG.—*l.c.*, plt. xiv, 8.

ORIG. DESCRIP.—“Dark.”

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STUDIES IN THE GEOGRAPHY OF LEPIDOPTERA.

By E. P. WILTSHIRE, F.R.E.S.

13,820

In subsequent articles in this series the author hopes to deal with species or ecofaunas, but in this, first, introductory article, he brings forward some of his general conclusions reached after at least ten years' field work abroad and relevant reading, and also a shorter period of field work in this country.

I.—TYPES OF EVIDENCE FOR HISTORICAL THEORIES.

Every creature's range has been determined by ecological factors and also by historical factors, recent or geological. Historical factors, as a matter of fact, are only ecological factors not contemporary, and, therefore, not possible to study as closely as contemporary ecological factors.

Palaeontological evidence is the best basis for the reconstruction of the past history of plants or animals, but it is not the only possible basis. A tentative reconstruction may also be based on taxonomic grounds, that is, from a comparison between their present distribution and their structural classification; or alternatively on ecological grounds, that is, from a comparison between their present ecology and the known geological history of the regions involved.

Since adequate palaeontological evidence of Lepidoptera has not been and probably never will be discovered, zoogeographical studies of Lepidoptera should, if possible, be based on both these alternatives.

The palaeobotany and palaeontology of the Tertiary and Recent epochs must be studied, so that the migrations, appearances and extinctions of the successive floras and faunas may afford analogies for the Lepidoptera under consideration. Since flowering plants first appeared in the Cretaceous, and the earliest known lepidopterous fossil is from Eocene strata, a knowledge of remoter epochs is not strictly necessary. In default of palaeontological evidence, direct proof of the reconstructed history will be lacking, and in Lepidoptera probably the best that can be hoped for is that the conclusions based on the above diverse alternative grounds should agree; that would be circumstantial evidence of a persuasive kind.

Evidence based on ecological analogy becomes less valuable for deductions involving a remoter period; for the ecological valency of a species presumably evolves simultaneously with its taxonomic characters, and the ecology of the remoter ancestors of a species cannot be as safely inferred from its known ecology as can that of the more immediate ancestors. It is not, however, unreasonable to suppose that an ancestor, if still specifically identical with its present descendant, had a similar ecology; indeed, Warnecke has called this supposition "the indispensable postulate" underlying all zoogeographical speculation. In certain cases, where a taxonomic group of species is sharply characterised ecologically (e.g. the hydrophytic-boring group *Phragmitiphila-Archana* (*Nonagria*) or the genus *Clytie*, which is monophagous on the genus *Tamarix*) a similar assumption can be made about closely related but not necessarily identical ancestors. Rarely, if at all, in Lepidoptera can the ecology be inferred from the structure of a fossil as it often can be in other Phyla or Orders.

For genera or groups whose living members show a wide ecological diversity, therefore, the only available grounds for historical theories covering the Tertiary Epoch are geographical and taxonomic evidence and the mere analogy of general floral and faunal histories. Dr Verity's theories would seem to be so grounded. Dr Beirne's theories, which do not try to go so far back, have a similar basis, except that the emphasis is rather on the geographical and geological than the taxonomic evidence. For groups sharply characterised ecologically, ecological analogy would be a good additional basis for theorisation.

Most of such theorisation is at present impeded by our lack of full ecological evidence for the forms and species under consideration and by the lack of adequate geological evidence regarding all the regions involved. These objections do not apply to Dr Beirne's findings, which are confined to regions well studied geologically and comparatively well studied ecologically. While it is most improbable that enough butterfly or moth fossils will be discovered to provide factual proof of lepidoptera-histories, it is not unreasonable to hope that one day our geological and ecological data will render far-reaching theories less speculative.

If the above general principles are sound, the following will be the more fruitful directions of activity for lepidopterists interested in zoogeography:—Firstly, taxonomic studies with the aim of grouping phylogenetically the geographical forms of a species and the different species of a group; secondly, ecological studies, determining the limiting factors of each species and defining the biotope or biotopes in which it is found and its status in each; thirdly, the exploration of little known regions with the aim of drawing up faunal lists in which taxonomic and ecological accuracy is essential. On the negative side, these lepidopterists should firstly refrain from wasting their energies drawing up local lists of well-known territory without ecological precision, and, secondly, should restrict their historical theories to the Pleistocene Epoch or to groups with a well-characterised ecology. The geography of Lepidoptera can also make little progress without the co-operation of the geologist abroad, especially in the close study of Tertiary and Recent rocks and deposits, our knowledge of which is still very defective. Finally, the lepidopterist-geographer must to a great extent resign himself to laying the ground-work for the future historical reconstructions that cannot at present safely be made.

SUBSTITUTE FOOD-PLANTS.

By D. G. SEVASTOPULO, F.R.E.S.

Mr Wiltshire's recent article under this title in this Journal (1943, iv, pp. 79-85) has tempted me to classify the hundred and thirty odd species of Lepidoptera that I have bred in Calcutta during the last few years, and whose food-plants have been identified, on similar lines and see if they would also fall into tidy groups. The results were interesting: 136 species were involved and fed on 70 different food-plants; of these 100 species feeding on 42 different plants could be connected by starting from one plant and listing the species feeding on it, then taking the other food-plants of these species and so on. It is possible that an even

greater degree of linking up could have been achieved if I had worked from recorded food-plants instead of from my own observations in Calcutta only. *Prodenia litura*, F., for instance, is recorded from over seventy plants ranging from Cauliflowers to Bananas against the eight species on which I have found it. I have not included any Psychids in my list, firstly because they seem to be truly polyphagous and can be fed first on one thing and then on another without any trouble, and secondly because many of the identifications seem open to doubt.

In the list that follows the species are grouped under the different food-plants, the numbers in brackets after certain species referring to the other plants on which the species feeds. In a few cases species are marked with an asterisk. These are species that have been bred from ova laid in captivity and on what was almost certainly an unnatural food-plant as only a few stunted imagines were reared.

1. *Michelia champaca* (MAGNOLIACEAE).
Graphium doson, Esp. (Papilionidae)—(2).
2. *Polyalthia longifolia* (ANNONACEAE).
G. doson—(1); *Thalassodes quadraria*, Guen. (Geometridae).
3. *Tinospora cordifolia* (MENISPERMACEAE).
Altha nivea, Wlk. (Limacodidae)—(61); *Ophideres fullonica*, L. (Noctuidae); *Argadesa materna*, L. (Noctuidae).
4. *Argemone mexicana* (PAPAVERACEAE).
Prodenia litura, F. (Noctuidae)—(38, 39, 42, 51, 58, 61, 68).
5. *Capparis horrida* (CAPPARIDACEAE).
Leptosia nina, F. (Pieridae); *Cepora nerissa*, F. (Pieridae); *Anapheis aurota*, F. (*Belenois mesentina*, Cr.) (Pieridae); *Valeria valeria*, F. (Pieridae); *Portheia scintillans*, Wlk. (Lymantriidae)—(16, 31, 36, 37, 53, 54, 61).
6. *Flacourtia* sp. (BIXACEAE).
Atella phalanta, Drury (Nymphalidae).
7. Garden Carnation (CARYOPHYLLACEAE).
Chloridea obsoleta, F. (Noctuidae)—(51).
8. *Sida rhombifolia* (MALVACEAE).
Syrictus galba, F. (Hesperiidae).
9. Garden Hollyhock (MALVACEAE).
Phytometra eriosoma, Dbl. (Noctuidae); *Cosmophila erosa*, Hbn. (Noctuidae); *Sylepta derogata*, F. (Pyralidae)—(10).
10. *Hibiscus rosa-sinensis* (MALVACEAE).
S. derogata—(9).
11. *Oxalis corniculata* (GERANIACEAE).
Zizeeria maha, Koll. (Lycaenidae).
12. Garden Balsam (GERANIACEAE).
Theretra oldenlandiae, F. (Sphingidae)—(68); *Zinckenia perspectalis*, Cr. (Pyralidae).
13. *Citrus* spp. (RUTACEAE).
Papilio polytes, L. (Papilionidae)—(14); *Papilio demoleus*, L. (Papilionidae)—(14); *Chilades latus*, Cr. (Lycaenidae).
14. *Aegle marmelos* (RUTACEAE).
P. polytes—(13); *P. demoleus*—(13).
15. *Melia azadirachta* (MELIACEAE).
Trabala vishnu, Lef. (Lasiocampidae)—(30, 32, 61).
16. *Zizyphus jujuba* (RHAMNACEAE).
Tarucus nara, Koll. (Lycaenidae); *Nola fuscibasalis*, Hamps. (Arctiidae); *P. scintillans*—(5, 31, 36, 37, 53, 54, 61); *Euproctis guttata*, Wlk. (Lymantriidae)—(31, 45); *Thoesa tripartita*, Moore (Limacodidae)—(61); *Beara dichromella*, Wlk. (Noctuidae); *Petelia medardaria*, H.-Sch. (Geometridae).
17. *Vitis* sp. (VITACEAE).
Theretra clotho, Drury (Sphingidae).
18. *Nephelium litchi* (SAPINDACEAE).
Rathinda amor, F. (Lycaenidae)—(34); *Pingasa ruginaria*, Guen. (Geometridae).
19. *Mangifera indica* (ANACARDIACEAE).
Euthalia garuda, Moore (Nymphalidae); *Dasychira mendosa*, Hbn. (Lymantriidae)—(31, 36, 61); *Lymantria nigra*, Moore (Lymantriidae); *Lymantria*

- ampla*, Wlk. (Lymantriidae)—(31, 61, 67); *Parasa lepida*, Cr. (Limacodidae)—(25, 26, 32, 33, 67).
20. Garden Pea (LEGUMINOSAE).
Cosmolyce boeticus, L. (Lycaenidae)—(21).
21. Lupin (LEGUMINOSAE).
C. boeticus—(20).
22. *Aeschynomene indica* (LEGUMINOSAE).
Scopula emissaria, Wlk. (Geometridae).
23. *Phaseolus* sp. (LEGUMINOSAE).
Striglina scitaria, Wlk. (Thyrididae).
24. *Rhynchosia minima* (LEGUMINOSAE).
Zizeeria trochilus, Fr. (Lycaenidae); *Mocis undata*, F. (Noctuidae); *Chalciope hyppasia*, Cr. (Noctuidae).
25. *Pterocarpus indica* (LEGUMINOSAE).
P. lepida—(19, 26, 32, 33, 67).
26. *Cassia fistula* (LEGUMINOSAE).
Catopsilia crocale, Cr. (Pieridae)—(27); *Catopsilia pomona*, F. (Pieridae)—(27); *Stauropus alternus*, Wlk. (Notodontidae)—(61); *Xyleutes leuconotus*, Wlk. (Cossidae)—(Internal feeder); *Thosea cana*, Wlk. (Limacodidae); *P. lepida*—(19, 25, 32, 33, 67); *Ericia inangulata*, Guen. (Noctuidae); *Buzura suppressaria*, Guen. (Geometridae)—(27, 31, 45); *Trachylepidia frutticassia*, Rag. (Pyralidae)—(Seeds); *Phryganodes analis*, Snell. (Pyralidae).
27. *Cassia siamea* (LEGUMINOSAE).
C. crocale—(26); *C. pomona*—(26); *B. suppressaria*—(26, 31, 45).
28. *Albizia stipulata* (LEGUMINOSAE).
Polydesma umbricola, Bsd. (Noctuidae).
29. Garden Rose (ROSACEAE).
Trypanophora semihyalina, Koll. (Zygaenidae)—(31, 32, 33, 45, 61); *Achaea melicerte*, Drury (Noctuidae)—(61); *Thalassodes veraria*, Guen. (Geometridae)—(35).
30. *Quisqualis indica* (COMBRETACEAE).
Rapala schistaceae, Moore (Lycaenidae); *Roeselia fola*, Swinh. (Arctiidae); *Euproctis subfasciata*, Wlk. (Lymantriidae); *T. vishnu*—(15, 32, 61); *Eupterote undata*, Blch. (Eupterotidae)—(52, 60, 67, 69); *Anua coronata*, F. (Noctuidae).
31. *Lagerstroemia indica* (LYTHRACEAE).
T. semihyalina—(29, 32, 33, 45, 61); *D. mendosa*—(19, 36, 61); *Orgyia postica*, Wlk. (Lymantriidae); *L. ampla*—(19, 61, 67); *Leucoma submarginata*, Wlk. (Lymantriidae)*; *Porthesia xanthorrhoea*, Koll. (Lymantriidae); *P. scintillans*—(5, 16, 36, 37, 53, 54, 61); *E. guttata*—(16, 45); *Eupterote geminata*, Wlk. (Eupterotidae); *Natada suffusa*, Moore (Limacodidae)—(45); *Selepa celtis*, Moore (Noctuidae); *Symitha notatella*, Wlk. (Noctuidae)—(32); *B. suppressaria*—(26, 27, 45).
32. *Lagerstroemia flos-reginae* (LYTHRACEAE).
T. semihyalina—(29, 31, 33, 45, 61); *T. vishnu*—(15, 30, 61); *P. lepida*—(19, 25, 26, 33, 67); *S. notatella*—(31).
33. *Gardenia florida* (RUBIACEAE).
T. semihyalina—(29, 31, 32, 45, 61); *Cephonodes hylas*, L. (Sphingidae)—(34); *P. lepida*—(19, 25, 26, 32, 67).
34. *Ixora coccinea* (RUBIACEAE).
R. amor—(18); *C. hylas*—(33).
35. Garden Chrysanthemum (COMPOSITAE).
T. veraria—(29).
36. Garden Sunflower (COMPOSITAE).
Diacrisia obliqua, Wlk. (Arctiidae)—(39, 49, 51); *D. mendosa*—(19, 31, 61); *P. scintillans*—(5, 16, 31, 37, 53, 54, 61).
37. Orange Cosmos (COMPOSITAE).
Amata passalis, F. (Syntomidae)*—(39*); *Amata cyssea*, Cr. (Syntomidae)*—(39*); *Amsacta lineola*, F. (Arctiidae)*; *Cretonotus transiens*, Wlk. (Arctiidae)—(39, 69); *P. scintillans*—(5, 16, 31, 36, 53, 54, 61); *Prospalta capensis*, Guen. (Noctuidae)—(41).
38. Garden Zinnia (COMPOSITAE).
P. litura—(4, 39, 42, 51, 58, 61, 68).
39. Garden Dahlia (COMPOSITAE).
*A. passalis**—(37*); *A. cyssea**—(37*); *D. obliqua*—(36, 49, 51); *C. transiens*—(37, 69); *Pericallia ricini*, F. (Arctiidae)—(61); *Utetheisa lotrix*, Cr. (Arctiidae)*—(49); *P. litura*—(4, 38, 42, 51, 58, 61, 68).

40. Garden Coreopsis (COMPOSITAE).
Prospalta pallidipennis, Warr. (Noctuidae).
41. Garden Calendula (COMPOSITAE).
P. capensis—(37).
42. Garden Lettuce (COMPOSITAE).
P. litura—(4, 38, 39, 51, 58, 61, 68).
43. Mimusops elengi (SAPOTACEAE).
Metanastria hyrtaca, Cr. (Lasiocampidae).
44. Jasminum sambac (OLEACEAE).
Glyphodes unionalis, Hbn. (Pyralidae); *Lepyrodes neptis*, Cr. (Pyralidae).
45. Carissa carandas (APOCYNACEAE).
Euploea core, Cr. (Danaiidae)—(47, 63); *T. semihyalina*—(29, 31, 32, 33, 61); *Euproctis lunata*, Wlk. (Lymantriidae); *E. guttata*—(16, 31); *Estigena pardalis*, Wlk. (Lasiocampidae); *Nephele didyma*, F. (Sphingidae); *N. suffusa*—(31); *Agathia laetata*, F. (Geometridae)—(47); *B. suppressaria*—(26, 27, 31).
46. Tabernaemontana coronaria (APOCYNACEAE).
Deilephila nerii, L. (Sphingidae)—(47); *Glyphodes vertumnalis*, Guen. (Pyralidae).
47. Nerium odoratum (APOCYNACEAE).
E. core—(45, 63); *D. nerii*—(46); *A. laetata*—(45); *Agathia lycanaria*, Koll.
48. Calotropis procera (ASCLEPIADACEAE).
Danaus chrysippus, L. (Danaiidae); *Pyrausta incoloralis*, Guen. (Pyralidae).
49. Heliotropium indicum (BORAGINACEAE).
D. obliqua—(36, 39, 51); *U. lotrix*—(39*); *Utetheisa pulchelloides*, Hamps. (Arctiidae).
50. Ipomoea palmata (CONVOLVULACEAE).
Herse convolvuli, L. (Sphingidae).
51. Garden Antirrhinum (SCROPHULARIACEAE).
D. obliqua—(36, 39, 49); *P. litura*—(4, 38, 39, 42, 58, 61, 68); *C. obsoleta*—(7); *Phytometra jessica*, Btlr. (Noctuidae).
52. Lantana camara (VERBENACEAE).
E. undata—(30, 60, 67, 69).
53. Lantana sellowiana (VERBENACEAE).
P. scintillans—(5, 16, 31, 36, 37, 54, 61); *Scopula cleoraria*, Wlk. (Geometridae).
54. Clerodendrum infortunatum (VERBENACEAE).
P. scintillans—(5, 16, 31, 36, 37, 53, 61).
55. Durlanta ellisii (VERBENACEAE).
Acherontia lachesis, F. (Sphingidae).
56. Boerhaavia repens (NYCTAGINACEAE).
Hippotion boerhaviae, F. (Sphingidae).
57. Amaranthus sp. (AMARANTACEAE).
Ilattia octo, Guen. (Noctuidae).
58. Spinacia oleracea (CHENOPODIACEAE).
P. litura—(4, 38, 39, 42, 51, 61, 68).
59. Aristolochia sp. (ARISTOLOCHIACEAE).
Polydorus aristolochiae, F. (Papilionidae).
60. Alseodaphne semecarpifolia (LAURACEAE).
Chilasa clytia, L. (Papilionidae); *E. undata*—(30, 52, 67, 69).
61. Ricinus communis (EUPHORBIACEAE).
Ergolis merione, Cr. (Nymphalidae); *T. semihyalina*—(29, 31, 32, 33, 45); *P. ricini*—(39); *D. mendosa*—(19, 31, 36); *L. ampla*—(19, 31, 67); *P. scintillans*—(5, 16, 31, 36, 37, 53, 54); *T. vishnu*—(15, 30, 32); *S. alternus*—(26); *N. suffusa*—(31); *T. tripartita*—(16); *A. nivea*—(3); *Narosa doenia*, Moore (Limacodidae); *P. litura*—(4, 38, 39, 42, 51, 58, 68); *A. melicerte*—(29); *Parallelia algira*, L. (Noctuidae); *Hyposidra talaca*, Wlk. (Geometridae); *Dichocrocis punctiferalis*, Guen. (Pyralidae)—(seeds).
62. Streblus asper (URTICACEAE).
Ocinara varians, Wlk. (Bombycidae)—(63, 64).
63. Ficus religiosa (URTICACEAE).
E. core—(45, 47); *Aganais ficus*, F. (Arctiidae); *O. varians*—(62, 64); *Perina nuda*, F. (Lymantriidae)—(64); *Attatha ino*, Drury (Noctuidae); *Glyphodes bivittalis*, Guen. (Pyralidae).
64. Ficus bengalensis (URTICACEAE).
O. varians—(62, 63); *P. nuda*—(63).
65. Ficus hispida (URTICACEAE).
Asota caricae, Bsd. (Arctiidae).

66. LILIACEAE generally.
Polytela gloriosae, F. (Noctuidae); *Calogramma festiva*, Don. (Noctuidae).
67. PALMACEAE generally.
Elymnias hypermnestra, L. (Satyridae); *Suastus gremius*, F. (Hesperiidae);
L. ampla—(19, 31, 61); *E. undata*—(30, 52, 60, 69); *Thosea loesa*, Moore (Lima-
codidae); *P. lepida*—(19, 25, 26, 32, 33).
68. AROIDEAE generally.
T. oldenlandiae—(12); *Theretra pinastriana*, Mart. (Sphingidae); *Rhyncholaba*
acteus, Cr. (Sphingidae); *P. litura*—(4, 38, 39, 42, 51, 58, 61).
69. Grasses (GRAMINEAE).
Mycalestes perseus, F. (Satyridae); *Mycalestes visala*, Moore (Satyridae);
Ypthima huebneri, Kirby (Satyridae); *Melanitis leda*, L. (Satyridae); *Baoris*
zelleri, Led. (Hesperiidae); *C. transtiens*—(37, 39); *Dasychira pennatula*, F.
(Lymantriidae); *Laelia exclamaticis*, Koll. (Lymantriidae); *E. undata*—(30,
52, 60, 67); *Agrotis spinifera*, Hbn. (Noctuidae); *Sideridis insularis*, Btlr.
(Noctuidae); *Sideridis yu*, Guen. (Noctuidae); *Sideridis venalba*, Moore (Noct-
uidae); *Spodoptera mauritia*, Bsd. (Noctuidae); *Spodoptera pecten*, Guen.
(Noctuidae); *Spodoptera cithium*, Guen. (Noctuidae); *Mocis frugalis*, F. (Noct-
uidae).
70. Bamboo (GRAMINEAE).
Matapa aria, Moore (Hesperiidae); *Astycus pythias*, Mab. (Hesperiidae); *Crocio-*
dophora ptyophora, Hamps. (Pyralidae).
- Calcutta, 2.iv.44.

NEW FOREST AND DISTRICT NOTES.

By S. G. CASTLE RUSSELL.

In continuation of my Notes in your last issue, since 1st May there has been very little increase in the number of butterflies on the wing, perhaps due to the persistent cold winds that blow from all directions. Although the Highcliffe and New Milton district is well wooded with several promising looking localities, daily walks through these have disclosed nothing but an occasional *Pararge aegeria*, L., *Pararge megera*, L., *Gonepteryx rhamni*, Linn., and the common "whites." Most of the butterflies in the neighbourhood congregate on a small sheltered length of the local railway bank. Here are to be seen in small numbers all the species that inhabit this district. On 2nd May I saw here three male *Colias croceus*, Fourcy., but I have seen none since, and fear that the sudden cold and windy blitz that set in at that day was too much for the colony that may have arrived on this coast. Recently, whilst descending the bank to look at a ♀ *Lycaena phlaeas*, L., I disturbed, quite close, a white form which after capture and examination turned out to be a small male in fresh condition of a colour intermediate between ab. *alba* and ab. *schmidtii*. Shortly after, much to my surprise, I netted a fresh male of *Melitaea cinxia*, L. This I surmise has arrived from the I. of Wight, the nearest place where it occurs, some 12 miles as the crow flies. I know of a local collector who is running a number of the larvae, but he tells me that no imago has as yet emerged in his cages. In past years a few have been seen on the wing at Hurst Castle in the very limited area there, and along this coast there are undercliffs which might well harbour the species. From my own experience I know that *M. cinxia*, like *M. aurinia*, will wander many miles away from its place of birth, or where it has been put down for stocking purposes.

On 18th May I went to the Ladycross district in company with Mr Clarke of Brockenhurst. The weather was against us, however, and in

consequence of rain and absence of sunshine very few insects were seen on the wing. A few larvae of *Limenitis camilla*, L., were found on honeysuckle low on the ground, where they were not very apparent. I think that for every larva found at least a dozen must be passed unobserved. In those past seasons when this butterfly was very abundant the larvae could easily be found on honeysuckle climbing around trees, but few are seen there nowadays. This species, like most others, is subject to fluctuations in point of numbers, and to-day they are sharing the scarcity exhibited by other species in the Forest.

On 20th May I spent the day in two of the Southern group of Forest enclosures, and although favoured with some nice spells of sunshine I saw only half-a-dozen *Argynnis euphrosyne*, L., and a few *G. rhamni* and *P. megera*. Three or four *L. camilla* larvae were located and beating oak trees produced only one *Thecla quercus*. The Southern group of enclosures seem to be denuded of butterfly life, for no apparent reason, as this scarcity existed before the Forest was requisitioned for timber. All these enclosures are but little frequented and very little collected. Holmesley enclosure had grown so dense and neglected that it is not surprising that the butterflies deserted it, but the other enclosures seemed suitable for them. They have all now been ravaged by the wood-cutters and the open spaces cleared, already planted, or being planted with young fir trees. The Forest generally appears to be well on the way to becoming a second "Black Forest" of pines. The enclosures in the central part of the Forest still retain a fair modicum of butterflies, although in woefully small numbers as compared with former years. Like the good old days of Queen Victoria, abundance of any species is a thing of the past.

On 22nd May I paid a visit to the enclosures near Brockenhurst, but as I was favoured with only two ten-minute periods of sunshine during the whole day I had not much opportunity of judging of the numbers of insects about. So far as I could see, *A. euphrosyne* would have been plentiful had the weather been more suitable.

TERMINOLOGY IN NATURAL SCIENCE.

III. The attention of authors and writers of Notes and those responsible for the publication of articles containing references to the *Lycaenidae* is directed to the basis of the terminology of the wonderfully well recorded variation of *Lysandra (Polyommatus) coridon* in the volume compiled by Bright and Leeds.

The terminology used in this volume is of two kinds: (1) *Varietal Names*, which have for the most part been bestowed by observers to designate an example which differs in some more or less obvious peculiarity and often affords no indication of the character of the aberration. All such are noted in text by being placed in Italics, some even being the Latinized names of persons.

(2) It is obvious to all observers that the great majority of aberrant forms diverge from the nominotypical form by more than one, often may be half a dozen, characters, particularly in the *Rhopalocera*.

These compound aberrations could not be indicated by a single name, so Bright and Leeds selected a large number of *Terms* each designating

a particular aberrant character, and the combination of two or more of these "terms" have adequately indicated the particular characters of the aberrant example intended. Such cannot be called names, but are phrases, descriptions, comparable to the descriptions of pre-Linnean days before the use of the binomial nomenclature. It must be pointed out that these phrases are far more useful than a name which does not indicate the insect, but which has to be a matter of memory only for association of name and insect. Therefore it is practically impossible to Index these aberrations with the names, form and species, and *no Italics should be used* for these descriptions and *no authority* is needed. The point is that *Names* cannot be employed here and therefore Italics are useless and superfluous.—HY. J. T.

OBSERVATIONS ON LEPIDOPTERA IN A LITTLE KNOWN AREA OF S. AMERICA. (A REVIEW.)

By HY. J. T.

Our correspondent and friend, Kenneth J. Hayward of the Argentine and now located at Tucuman far up the country, has edited a series of Biological Notes on Moths made by the late Rudolpho Schreiter, a very observant and ardent entomologist. Hayward has carefully edited these notes and expanded them with his own experiences and his knowledge of the literature such as the work of Seitz and of Dr Jordán, and much extracted from the Argentine natural history records. It is published in the initial volume of *De Acta Zoologica Lilloana del Instituto Miguel Lillo*, I, 7-44, pls. I-XXVI (several coloured).

These Notes begin with Observations on the Mass Movement of the Argentine form of *Pieris phileta*, ssp. *monuste*, the larvae of which occurred in enormous numbers in the summer of 1930 on *Capparis* sps., etc., shrubs. The record of the subsequent Mass Movements which took place in the following December 1930 and January 1931 is described, with plate I showing a gathering of the imagines on an *Araucaria* ready for their dispersal flight. Notes are added on the Movements of other species of Insects in the Tucuman area. Then follow notes with text figures on the larvae and pupae of the Danaid *R. hymenaea*, the Nymphalids *Hypanartia lethe* and *Chlorippe burmeisteri* (plt. III), and of *Libythea carinenta*. The subsequent Notes nearly all relate to species of Lepidoptera usually placed in the "omnium gatherum" Bombyces, all being well illustrated on the appended plates.

The three species with processionary larvae, which occur locally, are *Titya candida* and *T. incerta* with *Artace rubricosta*. The larvae of the two former species are polyphagous, devouring arborescent Leguminosae, Rhamnaceae, Salicaceae, and the quebracha trees, etc., thus affording opportunity for continuous observation not possible in the case of the species of our European pine forests. All three species are Lasiocampids. There is a plate of a "procession" on a trunk of *Acacia macrantha*, and dorsal and lateral views of a larva of *T. tucumana*, a quite recently recognized species, of which the dorsal view shows the lateral tufts of thick hairs not obvious in the lateral, a camouflage exhibited by the larvae of our *Catocala* sps.

South America is well known as being the home of many brilliant Saturniids, and of such Schreiter was a keen observer and made many notes. The writer of this review possesses a few examples of most of them, sent him by his correspondents. On one occasion he referred them to the late Lord Rothschild for information on them. The answer was that so little was known of them that it was impossible even to name them with certainty. The late Dr Packard collected in three magnificently illustrated volumes, issued in the early years of this century in the U.S.A., all that was known about them; since when but little has been added, and these notes made on the spot by a reliable local observer are of considerable interest and use in most cases. Of the genus *Rothschildia* three species are commented on, and two older known *R. maurus* and *R. arethusa* and the more recently described *R. condor*, Stdgr.? (1925), of which last is included a full-sized coloured figure of the larva, there is a figure of the larva of *R. maurus* on the same plate. The genus *Automeris* is well recognised by the very conspicuous "eye" occupying the hindwing. Of this genus some six species are dealt with, imagines (both sexes), larvae and cocoons are figured; viz. *A. stuarti*, *A. amanda*, *A. aspersa*, *A. incisa*, *A. naranja* and *A. oberthurii*. A short note on *Copaxa canella* and its polymorphic forms, sexual and local, with several figures of the imago, is given.

A Sphingid species, *Sesia tantalus*, feeds on species of Rubiaceae. The description of the larva, which is said to be easily confounded with those of the genus *Protoparce*, is given. This species differs from the *S. titan*, Cram., by the three hyaline semilunular spots in the forewing, by the absence of the white basal spots in the hindwings and by the less alar expanse. The author refers to another form or species ? of *Sesia* he observed at Oran in the province of Salta.

The finding of the larvae of two species of *Mimallonidae* is recorded, *Cicinnus cordubensis* and *C. despecta*; also of three species of *Megalopygidae*, viz., *Podalia nigrocostata*, *Megalopyga vulpina* and *M. nuda*, of each of which the foodplant is given.

Many details of the life-histories of three species of the large sized *Adelocephalidae* are given: (1) *Polyodonta arsenura*, a grand species seldom found in the Tucuman province, but coming from the warmer region of Salta; there is a coloured picture of the larva. (2) The very uncommon *Citheronia vogleri* with figures of ♂ and ♀ and of the larva. (3) Figures of the more or less diminutive form of the ssp. *tucumana* of the extremely fine *Eacles imperialis*, so admirably figured in Packard's volumes.

The only Microlepidoptera referred to is a Yponomeutid, *Atteva punctella*, the larvae of which feed on the Lauraceous shrubs in the sub-tropical portion of the Province of Tucuman in countless numbers, becoming a real pest.

A single Geometrid species is included, *Panthera unciaria*, "Probably one of the most common of the night-flying moths of Tucuman," the larvae of which feed on low plants of the family Urticaceae from November to March in incredible numbers.

Of the Cossidae two species are treated: (1) *Zeuzera melanoleuca*, whose larvae feed in the stems of *Celtis tala*, and probably in other species of *Allmaceae*; (2) *Xyleutes strigillata*, whose larvae feed in the stems of *Salix* species.

This publication is an extremely well written and useful record of local observation in a little known area in North-West Argentina.

COLLECTING NOTES.

DELAYED EXPANSION OF THE WINGS IN LEPIDOPTERA.—On 4th March 1944 a male *Sterrhya aversata*, L., emerged some time between 10 a.m. and 1 p.m., but at 10 p.m. its wings showed no sign of expanding. When I looked at it at 10 o'clock the next morning expansion was complete and perfect. As a rule the wings in this species begin to expand soon after emergence and expansion is rapid. My pupae were kept in a warm cupboard, but when I saw the moth had emerged I put it into a glass-topped box and left it in my bedroom, which was rather cold, and possibly the removal to a much colder atmosphere was the cause of the delay. Many similar records are scattered in entomological literature. For example Miss Fountaine says that a *Doritis apollinus* waited for 24 hours before beginning to expand its wings and then three of them expanded perfectly (M. E. Fountaine, *Entomol.*, 1902, **35**, 61). Expansion was delayed for many hours in the case of a male *Poecilopsis lapponaria* which I bred. A short discussion took place at the City of London Entomological Society, in which "Mr May said he had found that, if well shaken up in a pill-box, male *Apocheima hispidaria* expanded their wings, although they had been out of the pupa for some hours without showing the least sign of the usual expansion. Other members mentioned instances of Lepidoptera having only expanded after remaining unexpanded an unreasonable time since their emergence from pupa. Mr Tutt said that Lepidoptera (*Aglais urticae* in particular) might be removed from their pupa-shells some hours before they were due to emerge, and, if the thin membrane swathing the various parts had been carefully removed, they would wait till they were matured, and then the wings would expand as usual" (*Trans. City of London Ent. and N.H. Soc.*, 1895-96, 10). It happens fairly frequently with *Chesias rufata* and *C. legatella*, and I recorded a delay of 10 to 12 hours in the former species, but with *Lithostege griseata* it is quite a usual event, and in my own experience expansion may be delayed up to 66 hours and yet be completed successfully (*Entomol.*, 1913, **46**, 246).

The real interest is that in these cases of delayed expansion the wings remain soft for many hours, though they harden normally when expansion is complete, whereas in a normal moth the wings harden very soon after they have expanded. Hardening cannot be due to exposure to the air. The only explanation I can offer is that at some period between the time when expansion has begun and when it has finished a chemical substance is released into the blood and hardens the soft "chitin," presumably by altering its chemical constitution. If this is correct it is another example of a circulating hormone in the Insecta.—E. A. COCKAYNE, D.M., 16 Westbourne Street, London, W.2.

PIERIS NAPI, L., FROM THE WHITEHOUSE COLLECTION.—In the *Ent. Rec.*, LVI:1 your correspondent refers to a specimen of *P. napi* which constituted Lot 8 at the sale of the first portion of the Whitehouse collection as "having one side albino." This is obviously a copy from the catalogue description, and it will be clear to anyone who has seen

the specimen in question that it is erroneously described. It is not an albino, but has one side completely devoid of both the forewing spotting and the dark scales on the "veins" of both wings. Phenotypically it gives the impression of being half *P. napi* and half *P. rapae*, ab. *immaculata*. I have seen *P. napi* similarly "obsolete" on both sides, but his one is, as far as I know, the only specimen exhibiting this phenomenon on one side only. It was one of a brood bred by Mr L. W. Newman from a batch of local larvae which also produced several gynandromorphic examples, all of which I purchased.—J. ANTONY THOMPSON, M.A., F.R.E.S.

GYNANDROMORPHIC ARGYNNIS PAPHIA, L.—With regard to Mr E. P. Wiltshire's note in your last number of the *Record*, the history of the insect to which he refers is as follows:—At a meeting of the South London Entomological and Natural History Society held on the 8th November 1900, Mr W. F. Urwick exhibited "an hermaphrodite (*sic*) variety of *Argynnis paphia*, L. Right wings var. *valezina*; left wings ordinary type ♂ with the exception of a dark splash towards the base (vide *Entomologist* for October 1900). Captured on 28th July near Lyndhurst." On the label beneath the insect is the date and name of captor (E. Wiltshire) in handwriting.

At the sale of Mr Urwick's collection, some years after, the insect was bought by Sir Vauncy Harpur Crewe for £13. At the sale of the latter's collection it was bought by the late Mr P. M. Bright for £15. It was again sold in January 1942 at the sale of the P. M. Bright collection and bought by the late Sir E. A. Whitehouse for £15. At the Whitehouse sale in January 1944 it was sold for £20. The writer happened to be present at each of these sales.

The similarity of the captor's name to that of Mr E. P. Wiltshire is merely a coincidence. The name is not of great rarity in Hampshire and in the current editions of the South Hants Telephone Directories it occurs some 14 times, three of them having the first initial E. No one who is acquainted with Mr Wiltshire would accuse him of taking credit for an insect caught, as he says, ten years before he was born.—S. G. CASTLE RUSSELL, Highcliffe on Sea.

CURRENT NOTES.

THANKS to our subscribers, matter has come in, and we are going to publish the August and September numbers separately. This will also satisfy our advertisers. We may be late as our publishers get more and more handicapped by loss of staff.

WHEN the "mass-movement" of insects began to attract the attention of nature students the word "migration" was used without the slightest thought that this term carried centuries of implications from its exclusive use in human and other vertebrata association, and in no way could carry its significance if used in relation to a section of the animal world as the invertebrate insects. In the former use it was under a control of a mind of consciousness and thought aided by accumulated experience, such as was impossible in the latter. The word "mass-movement" used above seems to be as simple as possible and

without complications or inferences in its use and meaning. This term gives us not the slightest influence of the origin of the movement as does the term "migration." It is a purely distinctive term. Whereas we have been able to ascertain the causes of "migration" with probable certainty, the cause or causes of "mass-movement" among insects are awaiting discovery. Even now, only one or two instances of the locality from which the mass observed has assembled before moving, are known.

REVIEW.

We have received a separate from the *Bulletin of Entomological Research* entitled "The Larvae of Lepidoptera Associated with Stored Products," sent to us by the author, H. E. Hinton, Ph.D., of the Entomological Department of the British Museum. It is based on a careful study of the larval setae, or hairs, which are external structures situated in relatively definite positions and thus are readily examined on the living larvae without the technique of microscopical preparation. These structures were brought to the notice of the readers of our magazine by the late J. W. Tutt some forty or more years ago. In the third of Tutt's small volumes of *Practical Hints for Lepidopterists* were given two or three pages of simple notes illustrated by two admirable diagrammatic plates of setal arrangements in different segments of the larva.

In his remarks on larval descriptions Hinton writes: "The vast majority of the existing descriptions of the larvae of the Lepidoptera are based solely on colour and size, and, whatever may be the case as regards the Macro-lepidoptera, these descriptions are of very little value for the purpose of identifying the larvae of the Micro-lepidoptera. For example, the standard handbook of the British Lepidoptera by Meyrick (1928) describes the larvae of the common clothes moth, *Tineola biselliella*, as follows: "Larva whitish; head brown." It is clear that such a description will apply equally well to the majority of the Micro-lepidoptera and to many of the Macrolepidoptera. Although this description is short it is by no means unusually so. Even in the case of the more detailed descriptions of colour, such as those given by Buckler (1901) and Barrett (1904) for the larvae of the Pyralidae, the complete absence of any structural characters make them for the most part equally useless. Nor is the situation much better, as regards the illustrations given by these and other authors. When the larvae have striking or unusual colour patterns, these illustrations are adequate, but the coloured drawings of the majority of the Microlepidoptera cannot be relied on for the positive identification of the species, however much they may appeal to the aesthetic senses."

The author then describes how he has used the setae for his purpose, the system or parts of systems he has adopted from the studies of others, especially Fracker (1918) and Forbes (1923), and the terms he has adopted. This is succeeded by a Key to the larvae dealt with. The rest of the work, largely illustrated by diagrams, takes the various species in order of Families. It concludes with a short Bibliography of the references. The paper is one of great practical use, based on all the best and reliable researches up to date.—Hv. J. T.

ab. *olivacea*, Lenz., *Oest. Schm. Sudbay.*, II (2), 251 (1917).

FIG.—l.c., plt. xiv, 4.

ORIG. DESCRIP.—“Pale yellowish.”

ab. *medionigra*, Lenz., *Oest. Schm. Sudbay.*, II (2), 251 (1917).

FIG.—l.c., plt. xiv, 2, 6, 7.

ORIG. DESCRIP.—“With blackish darkening in the middle area, especially between the stigmata; with green ground colour.”

Aplecta, Gn. (1852), Dup., Hb. [*Rhyacia*, Hb. (1821), Warr.-Stz.: *Lycophotia*, Hb. (1821), Humph. & Wstw.: *Eurois*, Hb. (1821), Barr., Sth., Drdt.: *Agrotis*, Ochs. & Tr. (1816-25), Meyr., Stdgr., Splr., Culot & Meyr.: *Polia*, Ochs. & Tr. (1816-25), Steph., Curtis, Bdv., H.-S.] *occulta*, L. (1758).

Tutt, *Brit. Noct.*, III, 66 (1892): Meyr., *Hand.*, 96 (1895): Barr., *Lep. Br. I.*, IV, 106, plt. 150, 1 (1897): Stdgr., *Cat.*, IIIed., 153 (1901): Hamp., *Lep. Phal.*, IV, 533 (1903): Splr., *Schm. Eur.*, I, 165, plt. 36, 2 (1905): South, *M.B.I.*, I, 236, plt. 117, 3-4 (1907): Warr.-Stz., *Pal. Noct.*, III, 53, plt. 11g, 11h (1909): Culot, *N. et G.*, I (1), 93, plt. 15, f. 16; plt. 16, f. 16-17 (1909): Meyr., *Rev. Hand.*, 99 (1928): Drdt.-Stz., *Pal. Noct. Supp.*, III, 87, plt. 10e (1932).

Ernst & Engr., *Pap. d'Eur.*, VI, 95, f. 336 a, b (1788), gave two very good figures and pointed out that the hindwings were much shorter than the forewings. The figures were only sparsely marked with white scaling.

Esper., *Abbild. Noct.*, IV, 400, plt. 131, 5 (1789+), figured this species under the name *trimaculosa*. Werneb., *Beitr.*, II, 43, called it *hepatica*, Clerck (*tincta*, Tr.), which it certainly cannot be from absence of all reddish-brown coloration.

View., *Tabell. Brand.*, II, 55 (1790), listed it as *advena*.

Bork., *Naturg. Noct.*, IV, 542 (1793), said that Fabricius apparently was uncertain as to what this species was (*Mantissa*, II, 166) and that the descriptions by Linné (*Fn. S.*), Hufn. (*Berl. Mag.*), Schiff. (*Verz.*), Esper (*Abbild.*, IV), View. (*Tabell.*), were not in accord and even attributed it to other species. Villers gave two descriptions of *occulta* (*Ent. Linn.*, II, 224, 649), which did not agree with each other, the earlier one followed the Linn. description.

Hb., *Samml. Noct.*, 79 (1800-3), gave an excellent figure, perhaps too light in ground colour.

Treit., *Schm. Noct.*, V (2), 53 (1826), summed up the non-recognition by old authors very shortly and gave the strong recognition characters from other allied species, viz., the pure white fringes of the hindwings, the conspicuous bluish-white wide transverse lines, and the particular pattern of the forewing. It is related to *nebulosa*.

Dup., *Hist. Nat.*, VI, 386, plt. 97, 2 (1826), gave a good figure, but some of the black marking was too emphasized. In the *Supp.*, III, 592, plt. 49, 4 (1836), he gave a figure of the form *implicata*, Lef., treating it as a good species. A very good figure, dark grey with very dark grey markings edged with black lines, but his description does not agree. He

speaks of two denticulate, whitish lines; two stigmata with black centres; a conspicuous white orbicular; the reniform of an obscure grey hardly to be distinguished from the ground colour. The hindwings are of a colour I do not call sooty black as they are termed. The figure is somewhat smaller but the description does not mention size.

Curtis, *Brit. Entomology*, VI, plt. 248 (1829), gave an excellent figure.

Freyer, *Beitr.*, I, 30, plt. x (1827), gave a good figure and in the text he gave an account of breeding this species from the egg.

H.-S., *Sys. Bearb. Noct.*, II, 263 (1850), said that the figure Hb. 79 was somewhat too narrow and the orbicular large, and that *implicata* was very near the typical form.

Gn., *Hist. Nat.*, VI, 76 (1852), treated *implicata* as a separate species. His description of it is a description of the typical form of *occulta*, of which species he has given no description. In this he has been followed by Stdgr., and to an extent by Hampson. Gn. described it as smaller, more unicolorous, paler, more pinkish, less cloudy, wings not so oblong, lines less angular, the reniform is straighter, the terminal markings smaller, the thorax more uniform.

Newman, *Brit. Moths*, 406 (1869), gave two very good figures (b. and w.), one typical and the other the black Scottish form.

Stdgr., *Cat.*, IIIed., 153 (1901), included *implicata*, Lef., and *extricata*, Zett., as synonyms, and *passetii*, Th.-Mg., much more obscure, with *implicata*, Lef., smaller, forewings obscure dull grey without markings (obsolescent). His description of *implicata* is an absolute error in which he followed Gn.

Spuler, *Schm. Eur.*, I, 165, plt. 36, 2 (1905), gave a very good figure of the grey typical form with more white features than usual. He dealt with the forms *implicata*, *extricata* and ab. *pallida*, but strange to say does not mention the really black form *passetii*.

Hamp., *Lep. Phal.*, IV (2), 533 (1903), only gave ab. *implicata* and ab. *passetii*.

South, *M.B.I.*, I, 236, plt. 117, 3-4 (1907), gave two excellent figures. The typical grey form and the black form *passetii*. He referred to a paler form and also to the evanescent rosy flush in very fresh examples and to intermediate forms between the two forms figured.

Rebel (in Berge, Ed. 9), plt. 30, f. 10b (1910), gave a good figure of the typical form, rather on the light side.

Warr.-Stz., *Pal. Noct.*, III, 53, plt. 11g, h, treated of the typical light grey suffused more or less with dark grey; the nearly black f. *implicata*, Lef., to which they place *passetii*, Th.-Mg., and *aethiops*, Robs., as synonyms; and the intermediate ab. *extricata*, Zett. The figures are not at all satisfactory and fail to depict the beautiful specimens one sees in collections.

Culot, *N. et G.*, I (1), 93, plt. 15, 16; plt. 16, 16-17 (1909), gave three good figures: 1, *occulta*, grey with dark grey markings; 2, *passetii*, the black form; and 3, *implicata*, the dark grey with black markings. He also dealt with *pallida*, Splr., and with *extricata*, Zett.

Drdt.-Stz., *Pal. Noct. Supp.*, III, 87, plt. 10e (1933), figured 10e, the type form of *implicata* now in the Oberthür collection; this is a grey form more or less like *grisea* named by Hannemann, which is a monotonous grey form whereas in *implicata* the grey is varied with darker markings. Ab. *pallida*, Splr., is paler and smaller. Form *passetii*,

Th.-Mg., is the black form, some of which are very beautiful. *Ab. roseovirgata* with rosy beautiful marking when quite fresh, which, however, is very fugitive. *Ab. rectangularata*, Stphan., in which the posterior transverse band forms a right angle below the costa. They describe two new forms, *fumea*, plt. 10e, from the Ili territory, and *tibetica*, plt. 10e.

Of the Variation Barrett said:

In freshly emerged specimens, especially those of the typical grey colouring, there is sometimes a beautiful tinge of faint purplish red dispersed in large clouds in the paler spaces of the forewings, especially beyond the reniform and claviform stigmata. This fades rapidly, while the insect is still alive, and indeed so far as I know, has only been observed in those reared in confinement; in a series reared by Mr Robert Adkin in the autumn and winter of 1894, this colouring was especially noticeable. In specimens which are now emerging in his cages (October 1896) no such tendency seems to be observable, but these are of a brilliant black, with the transverse stripes broadly and conspicuously white. These last are from eggs laid by a black Scottish example, and in the woods in the mountain districts of that country variation towards blackness of marbling, with grey or white lines and shades is very general, every conceivable gradation from the typical grey to deep black being found, but in almost all, the whitish colour of the transverse stripes, of the orbicular stigma, and the edging of the reniform stigma is maintained. The black variety seems to occur very rarely in the North of England, but one specimen has been taken by Mr G. Gardner near Hartlepool, Durham. On the other hand normal grey forms are found, in company with the darker varieties, at Cromarty and elsewhere in the North of Scotland, and the only specimen which has been found in Shetland is precisely like an English example. The only one taken in Ireland which I have seen is of a curious chalky-white colour with grey clouding. It was secured near Londonderry by Mr F. V. Campbell.

The Names and Forms to be considered:

occulta, L. (1758), *Sys. Nat.*, Xed., 514.

f. *implicata*, Lefbr. (1836), *Ann. S. Ent. Fr.*, 397, plt. 10, f. 4.

extricata, Zett. (1840), *Ins. Lap.*, 940.

ab. *passetii*, Th.-Mg. (1886), *Le Nat.*, VIII, 237.

ab. *aethiops*, Robs. (1887), *Young Nat.*, VIII (p. 24 in List of Varieties).

ab. *pallida*, Splr. (1905), *Schm. Eur.*, I, 165.

ab. *grisea*, Hanne. (1915), *Int. Ent. Zt.*, IX, 46.

ab. *rectangularis*, Stephan (1925), *Iris*, XXXIX, 19.

ab. *roseovirgata*, Dnhl. (1929), *Mitt. Münch.*, XIX, 106.

ssp. *fumea*, Drdt. (1933), *Pal. Noct. Supp.*, III, 88.

ssp. *tibetica*, Drdt. (1933), *l.c.*

ab. *semiconflua*, Lempke (1939), *Tijds.*, 234.

Tutt dealt with: (1) the type much mottled with grey; (2) the more or less melanitic form *implicata*; (3) the f. *aethiops* of Robson, a black form; (4) *extricata*, Zett., an intermediate form.

f. *implicata*, Lef., *Ann. Soc. Ent. Fr.*, V, 394, plt. 10, f. 4 (1836).

DESCRIP.—Dup., *Hist. Noct. Supp.*, III, 592, plt. 49, f. 4 (1836), ?(1842).

“Forewings above are blackish and crossed in their middle by two whit-

ish, denticulate lines closer together on the inner margin than on the costa and between which are placed the two usual stigmata, outlined in black. The orbicular is white and consequently quite prominent, while the reniform is of an obscure grey and scarcely shows in the ground colour; one sees also two other spots, one grey bordered with black and placed below the orbicular and which closely approaches one of the two lines, which we have just mentioned; the other whitish placed against the thorax and on the costa. At a short distance from the outer margin the wing is crossed by a series of black sagittate or cuneate spots. Finally, the edge of the ground colour is preceded by a line of black points. The hindwings and the undersides of all wings are entirely of a sooty black colour, with white fringes." The polar regions.

This description is not at all in agreement with the figure on the plate given by Duponchel in which there is nothing white or whitish. The figure is of a very blackish ground with deep black marking only the hindwing has a white fringe.

Drdt.-Stz., *Pal. Noct. Supp.*, III, 87, plt. 10e (1933), said "It is by no means identical with *passetii*," the black form with transverse lines more or less filled in with white. The figure 10e is from the "type in the Oberthür collection. [This may have faded in nearly a hundred years.] This certainly shows the lighter (dirty white) markings spoken of by Dup., but they are *not* white. The reniform too is of the lighter shade and not obsolescent (Dup.). The fig. of H.-S., *l.c.*, f. 632, is also a dark sooty-black with only slightly lighter markings, but does not agree with the description Dup., which should be correct, written as it must have been directly after the original by Lefebvre in vol. v of the *Ann. Soc. Fr.*

ab. *passetii*, Th.-Mg., *Le Nat.*, VIII, 237 (1886).

ORIG. DESCRIP.—"The forewings are of a deep black-brown, much more black than the type, with the usual lines scarcely marked. By their sombre colour, this fine aberration appears at first a distinct species; but a careful examination proves that it is only a very smoky aberration of *occulta*. It is found in Scotland, where I am told it replaces the typical form."

ab. *aethiops*, Robs. & Gard., *Young Nat.*, VIII (1887) ["Supp. List Named Varieties of Brit. Lep.," p. 24].

ORIG. DESCRIP.—"Black, lines and margins of stigmata greyish." N. of England.

ab. *pallida*, Splr., *Schm. Eur.*, I, 165 (1905).

ORIG. DESCRIP.—"The opposite to these (*implicata* and *extricata*) is a smaller form with narrow, whitish forewings without brown and with obsolescent forewing markings as Petersen has reported from Estland; it may be known as ab. *pallida*."

ab. *grisea*, Hanne., *Int. Ent. Zeit.* (1915), IX, 46.

ORIG. DESCRIP.—"Now and then in this district there occur examples, in which all the whitish-grey tone of colour on the forewings is wanting, and the lines and stigmata are so strongly suffused with dark grey, that the forewings appear almost uniformly coloured grey. Not-

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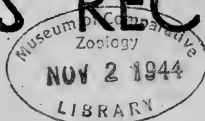
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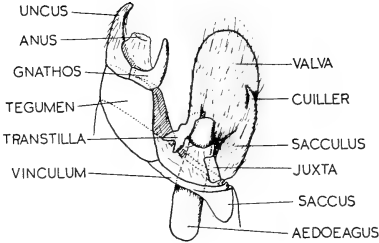
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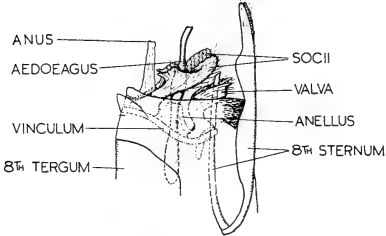
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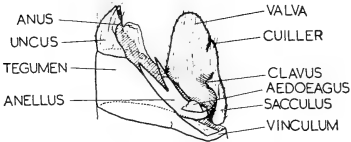
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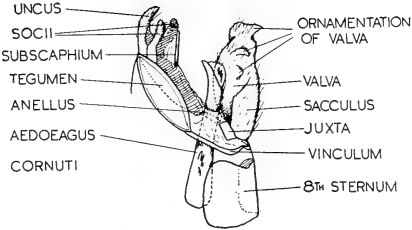
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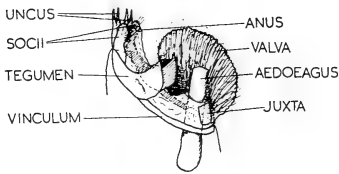
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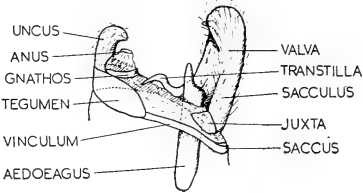
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NOTES ON THE MORPHOLOGY AND TAXONOMY OF THE GENITALIA OF THE BRITISH LEPIDOPTERA.

I.

(With Plate II.)

13,820

By BRYAN P. BEIRNE, Ph.D., M.R.I.A., F.R.E.S.



The genitalia of the majority of the British species of Lepidoptera have been figured in a series of books by the late F. N. Pierce and his collaborators (Pierce, 1909, 1914, 1942; Pierce and Metcalfe, 1922, 1935, 1398; and Pierce and Beirne, 1941). The last work deals with the butterflies and the larger moths. From a study of the genitalia I arrived at somewhat different conclusions, both as to the homologies of the various parts of the genitalia and as to the relationships of the various genera and species to each other, than did Mr Pierce, who was responsible for the text of that work. My views on the morphology and taxonomy of the genitalia of the Rhopalocera have been given in a previous paper (Beirne, 1942-3); the present paper deals with some of the moths.

The text of the present paper deals mainly with the taxonomy, and the species are classified in accordance with their relationships as indicated by the genitalia. Descriptions of the morphology of the genitalia have been reduced to the minimum and have been replaced by figures. It should be noted that these figures represent the typical forms of the genitalia in each group or genus, and, unless otherwise stated, are not figures of particular species. The figures are of the side views of the genitalia with the left valve removed. References are given in the text to the appropriate plates of Pierce and Beirne on which the genitalia of the species mentioned are figured, as well as to other works dealing with the genitalia. The nomenclature used here for the parts of the genitalia is that of Beirne (1942).

SPHINGIDAE. (Fig. 1; Pierce and Beirne, pls. VII-IX.) A rather homogeneous group. The chief variations of specific value occur in the males; in many cases the females are practically indistinguishable from each other. In the males the gnathos is usually large and strong; the valvae short and broad, each with the sacculus strongly sclerotized and with a prominent cuiller; transtillae and a juxta are usually present and the saccus is well developed. A characteristic feature of the group is that in the females the ovipositor lobes are large and heavily wrinkled. The apophyses in the female are large, the apical part of the ductus bursae is usually sclerotized, and the signa are in the form of two bands of short spines. Many of the British species are also figured by Rothschild and Jordan (1903) and by Skell (1921).

Mimas, Hübn. 1, *tiliae*, Linn.: shows close relationship to *Smerinthus*.

Smerinthus, Latr.: The combination of the hooked and pointed uncus, the triangular gnathos, the spined vesica and the bilobed cuiller appear to be the generic characters in the male, while in the female the broad and heavily sclerotized ductus and the apparent absence of a signum are characteristic. There appears to be no justification for placing the species in separate genera: the genitalia of the two are

very similar and the species are obviously very closely related. 2, *populi*, Linn. 3, *ocellatus*, Linn. (genotype):

Acherontia, Lasp. 4, *atropos*, Linn. (genotype): The only British Sphingid in which the gnathos is unsclerotized and for this reason it is rather distinct, but shows a definite relationship to *convolvuli*.

Herse, Oken. 5, *convolvuli*, Linn. (genotype): A rather distinct species but showing some relationship to *atropos*.

Sphinx, Linn. 6, *ligustri*, Linn. (genotype): A rather distinct species but showing some relationship to *atropos* and *convolvuli*.

Hyloicus, Hübn. 7, *pinastri*, Linn. (genotype): This rather distinct species has been divided into a number of subspecies by Jordan (1931), the differences resting chiefly in the relative lengths of the two arms of the cuiller. The form found in Britain is *pinastri pinastri*. The genitalia of specimens from different localities in Britain have been examined and they were all referable to that subspecies.

The next four genera, *Daphnis*, *Hippotion*, *Celerio* and *Deilephila*, are very closely related to each other, and, on the genitalia, there appears to be little reason why they are not synonymous. They are characterized by the hooked and very heavily sclerotized uncus and gnathos, by the tegumen extending around on either side to meet in the mid-ventral line below the gnathos, and by the membrane between the tegumen, gnathos and transtillae being more or less sclerotized. To the outsides of the valvae are attached large and specialized hair-scales. In the female the eighth sternum is reduced to a narrow band on either side, while the signum is in the form of a very long, straight, double band of short spines.

Daphnis, Hübn. 8, *nerii*, Linn. (genotype): A rather distinct species within the group but most closely related to *Hippotion*.

Hippotion, Hübn. 9, *celerio*, Linn. (genotype): Most closely related to *Daphnis* but also showing some affinity to *Hemaris*.

Celerio, Oken.: The only generic character appears to be the slender and pointed cuiller. The males of the three species are very similar. The females are apparently identical with each other and differ only very slightly from those of the following genus: 10, *galii*, Schiff. (genotype); 11, *euphorbiae*, Linn.; 12, *livornica*, Esp.

Deilephila, Lasp.: This genus is closely related to *Celerio*, differing mainly in the shorter and stouter cuiller. The genitalia of the two species are practically indistinguishable from each other. 13, *elpenor*, Linn. (genotype). 14, *porcellus*, Linn.

Macroglossum, Scop. 15, *stellatarum*, Linn. (genotype): The male is rather distinct but obviously closely related to *Celerio* and *Deilephila*, while the female is practically indistinguishable from females of those genera.

Hemaris, Dalm.: A rather distinct genus and the only British genus of the Sphingidae in which asymmetry of the genitalia normally occurs. The right valva (and sacculus) is always larger and better developed than the left. The spined projection of the sacculus, which is best developed in the right valva of *tityus*, is the clavus. Besides the asymmetry and presence of the clavus, other generic characters are the broad and squared saccus, the long and slender aedoeagus, the presence

of broad, flat and feebly sclerotized anellus lobes, and the split uncus. The females of the two British species are practically indistinguishable from each other. 16, *fuciformis*, Linn. (genotype). 17, *tityus*, Linn. (*bombyliformis*, Haw.).

NOTODONTIDAE. (Figs. 2-4; Pierce and Beirne, pls. IX-XI and pl. XXI.) The genitalia are often highly modified and ornamented. The males, and to a less extent the females, show strong specific characters and in many cases good generic characters, but these are often masked by the specific variations. In the male there is usually a pair of large, hairy socii, the tegumen is usually completely divided up the mid-line, the halves often being quite separate, and extends down on each side, taking the place of the lateral arms of the vinculum. The vinculum itself is consequently very much reduced, and, in most cases, there is no saccus. The eighth sternum is usually heavily sclerotized and its shape is of considerable specific value. The classification as indicated by the genitalia differs from the usual classification on a number of points. The species fall into a number of good species-groups.

Harpyia, Ochs.: The species of this genus are usually included in *Cerura* with *vinula*, but the genitalia show them to be quite distinct from that species. This genus is characterized by the beaked uncus, which has a flat, notched plate below it. The homology of this plate is doubtful; it may be the scaphium, or, more probably, it may represent the fused socii. The sides of the tegumen are very narrow, the costae and styles of the valvae are strongly sclerotized, while the remainder of each valva is more or less membranous. There is little to distinguish the genitalia of the three species from each other, the females in particular being practically identical. 1, *bicuspis*, Borkh. 2, *hermelina*, Göze. (*bifida*, Hübn.). 3, *furcula*, Linn.

Cerura, Schrank. 4, *vinula*, Linn. (genotype): A very distinct species, showing no relationship to *Harpyia*. It is apparently more closely related to *Notodonta* and allied genera.

Stenropus, Germ. 5, *fagi*, Linn. (genotype) (fig. 3): The male genitalia are very highly modified. Although very distinct, the species shows some affinity to the remaining *Notodontidae* in the presence of socii. The homologies of some of the parts of the male genitalia are obscure. The uncus is membranous but the socii are large and well-developed. The whole genitalia are withdrawn within the eighth segment, the sternum of which is produced as two large, flattened plates, from the inside of the base of which a long, heavily sclerotized arm extends up between the valvae; at either side of the eighth sternum is a patch of bristles. The valvae are small and somewhat resemble the socii in appearance.

Gluphisia, Boisd. 6, *crenata*, Esp. (genotype): A very distinct species. The male possibly shows some affinity to *Pheosia* and *Pterostoma* in the shapes of the uncus, tegumen and valvae. The uncus is very broad and flattened and is deeply emarginate at its apex. Characteristic features of the species are that the socii are absent but transtillae and a well-sclerotized scaphium are present. The female shows a definite relationship to *Pterostoma* and possibly some affinity to *Pheosia*.

Pheosia, Hübn.: The male genitalia are considerably modified, characteristic features being the great size of the uncus, socii and tegumen. Owing to the size of the tegumen the vinculum is very much reduced and is visible only as a short band on either side underneath the valva. There is a cone-shaped, sclerotized pocket between the bases of the valvae; in spite of its resemblance to a saccus its position indicates that it is probably the juxta. In general structure the male genitalia indicate a comparatively close relationship to *Pterostoma*. The aedoeagus is like that of *Ptilophora*, but this may be an instance of parallel development. The two species of *Pheosia* are very closely related to each other. 7, *tremula*, Clerck (*dictaea*, Esp.) (genotype). 8, *gnoma*, Fab. (*dictaeoides*, Esp.).

Pterostoma, Germ. 9, *palpina*, Clerck. (genotype): The general form of the male genitalia indicates a definite relationship to *Pheosia*. The female shows a relationship to *Glyptis*. (N.B.—In Pierce and Beirne, pl. XXI, the figure of the eighth sternum of this species is inverted.)

The next six genera show close relationships to each other.

Drymonia, Hübn.: The characteristic feature of the genus is the presence of a pair of arms arising one on each side between the anellus and the base of the valva. Their homology is doubtful; they may be well-developed cristae, or, less probably, they may be the harpes or the anellus lobes. 10, *dodonea*, Schiff. (*trimacula*, Esp.): as well as showing relationship to *ruficornis* this species also seems to show some affinity to *Notodonta anceps*. 11, *ruficornis*, Hufn. (*chaonia*, Hübn.).

Notodonta, Ochs.: A rather heterogeneous genus. The genitalia do not exhibit any reliable generic characters. Three of the species, *dromedarius*, *phoebe* and *torva*, might be separated from the remainder in a distinct genus. 12, *ziczac*, Linn. 13, *dromedarius*, Linn. (genotype): This species shows definite relationships to *torva* and *phoebe*. 14, *phoebe*, Sieb. (*tritophus*, Schiff.): Obviously very closely related to *torva*. 15, *torva*, Hübn. 16, *anceps* Göze. (*trepida*, Esp.): A rather distinct species, showing little relationship to the remaining British species of the genus.

Leucodonta, Staud. 17, *bicoloria*, Schiff. (genotype): This is obviously closely related to *Notodonta*. In both sexes of this species the anterior (basal) edges of the sterna of the abdominal segments are highly pigmented and sclerotized. This pigmentation is heaviest on the segments nearest to the base of the abdomen, and is also present in *carmelita*, *plumigera* and *chaonia*.

Lophopteryx, Steph.: Characteristic features of the genus appear to be the flattened projection near the anal angle of each valva, the shape of the uncus and the reduction in size of the socii. The two species are not very closely related. 18, *cucullina*, Hübn. (genotype) (*cuculla*, Esp.): The socii are absent. 19, *capucina*, Linn. (*caemelina*, Linn.) (genotype).

Odontesia, Hübn. 20, *carmelita*, Esp. (genotype): This shows a definite relationship to *Drymonia* and *Notodonta*, and is perhaps nearest to *ziczac*.

Ptilophora, Steph. 21, *plumigera*, Schiff. (genotype): A rather distinct species in both sexes. The shape of the aedoeagus might indicate

relationship to *Pheosia*, while the presence of a subscaphium further indicates relationship to that genus or to *Odontosia* or *Notodonta*.

Phalera, Hübn. 22, *bucephala*, Linn. (genotype): The male perhaps indicates a distant relationship to *Pheosia*, the female to *Pterostoma* or *Gluphisia*. In the female the ninth segment is complete and quite distinct from the ovipositor lobes.

Clostera, Samouelle: The male genitalia are very highly modified. Except for the presence of the socii this genus shows no relationship to any of the other British Notodontids, and certainly not to *Phalera*. The uncus is bifurcate and from its ventral surface arise a pair of spines, of doubtful homology. They do not represent the gnathos, because of their position, and are probably ornamentations developed in this genus only. The socii are the hairy lobes on either side of the uncus. The tegumen is produced inwards on either side ventrally as a large plate, the inner upper (i.e., posterior) corner of which is produced into a short spine. The valvae are in the form of membranous, heavily wrinkled sacs. The structure is very homogeneous in the three British species, and they are obviously very closely related to each other. 23, *curtula*, Linn. (genotype). 24, *anachoreta*, Fab. 25, *pigra*, Hufn. (*reclusa*, Fab.).

The Thyatiridae (Cymatophoridae) also possess socii in the male, indicating a relationship to the Notodontidae.

SATURNIIDAE. (Fig. 5; Pierce and Beirne, pl. XIV.)

Saturnia, Schrank. 1, *pavonia*, Linn. (genotype): The uncus and tegumen are large, a clavus and a short cuiller are present, and there is no saccus. The edge of the anellus is produced into two flat, tapering arms dorsally. The aedoeagus is unsclerotized, a very unusual feature in Lepidoptera, but characteristic of this group. The genitalia of a great many species are figured and described by Bouvier (1929-1935).

ENDROMIDIDAE. (Fig. 6; Pierce and Beirne, pl. XIV.)

Endromis, Ochs. 1, *versicolor*, Linn. (genotype): The genitalia are straightforward in structure.

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REPUTED MIMICRY IN PARERONIA VALERIA, CR.: CONSIDERED WITH REFERENCE TO OTHER INDO-AUSTRALIAN PIERIDAE.

By L. RICHMOND WHEELER, Ph.D., M.Sc., F.L.S.

To those familiar only with the "Whites" and "Yellows" of the North Temperate Zone, in which the sexes differ little in colour and black or dark markings on the upper surface are small or non-existent, a female *Pareronia*, black or dark brown above with whitish streaks and spots like some Danaiids, is a strange sight; particularly so is the form *lutescens*, Btlr., with yellow blotches in the proximal wing regions almost exactly like *Danaus aspasia*, F. It is often suggested that such apparently abnormal colours in a "White" butterfly can only be explained in terms of the mimicry theory, especially as *D. aspasia* is admittedly common and the female *Pareronia* is generally described as "quite rare."

The impression created by this apparent abnormality can, however, be corrected by analysis of the idea of rarity, by considering the systematic position of the genus *Pareronia*, and by comparative study of the coloration of the sexes in the numerous Pierid species which inhabit regions where *P. valeria* occurs, such as Malaya.

The number of Malayan species of Pieridae was given in 1934 by Corbet and Pendlebury (p. 73) as 48, and, despite various adjustments, the same number was reached by Dr Corbet in his revised list in 1942. Of these I have studied in the field and captured more than three-quarters, several of the remainder being very local or rare.

In nearly all the common species, including those of *Catopsilia* and *Eurema*, males and females are about equal in numbers, as is the case with Pieridae in such temperate countries as Britain, Canada, and Newfoundland. But in numerous Malayan Pierids Fruhstorfer (Seitz IX) and the authors mentioned described the females as very rare though the males abound in suitable localities (*o.c.*, pp. 92-3). This was my experience with a few species, such as *Appias nero* and *Hebomoia glaucippe*; however, I easily collected the supposedly rare females of *Saletara panda*, *Ixias pyrene* and *I. verna* (C. and P., 101, 102; Seitz, IX, 159). I had the pleasure of capturing the first *verna* females, and males, recorded from Malaya, and in each of the two other species my first two specimens were both females!

From 1920 onwards, under British protection, first-class, tarmac-covered highways used by motor vehicles largely replaced the old earth tracks and roads on which various animals were driven and ridden. So the beautiful crowds of butterflies, largely Pierids, which collected around seepages and the excreta of oxen and, occasionally, of elephants, became much rarer; and, as these crowds consisted largely of males, the visible disproportion between the sexes in some species has decreased, though there is no reason to think that the actual numbers diminished. Fruhstorfer mentioned these swarms as a general phenomenon in tropi-

cal countries (*o.c.*, p. 120 seq.), Distant (pp. 284-5) noted the preponderance of Pierid males up to 1882, Corbet and Pendlebury their recent decrease (*o.c.*, pp. 22 and 93). Intelligent Malays agreed with me that this had become very noticeable.

The female of *Pareronia valeria* is certainly much less frequently seen than the swift flying male. But Corbet and Pendlebury describe it as "found only in thick jungle," which alone would largely account for its relative scarcity, as in many other Pieridae. And when one learns to distinguish them from various Danaid species one can see that *valeria* females are less uncommon than is supposed; though it is difficult to net them—or anything else—in the very dense, prickly Malayan forest. However, my *syce* caught one on the bare summit of Pine Tree Hill, 4750 feet high; so, like some supposedly rare *Papilio* females, they may haunt the less accessible mountains while their males are often seen in lower regions. This certainly occurs among such *Euploea* as *leucostictos* and *mulciber*. In such species, notably the famous *P. brookiana albescens*, Rothsch., females are much less rare than they have been described to be, but are less easily captured than their males which have no egg-laying duties to keep them much of the day in dense jungle near the larval food-plants (Wheeler, 1940).

The systematic position of *Pareronia* and its Danaid affinities are significant. Fruhstorfer has pointed out that *Pareronia* resembles the Danaidae in the male scent organs and glossy hindwing areas of some species, in the neuration of both sexes, and the general pattern of the wings in all females; thus this genus may be regarded as "a kind of connecting link between the two families" (Seitz, IX, 177-8). Also, the male wing pattern, with its strong black veins, is common to many Danaids and Pierids, though the bluish ground colour is unique. On the other hand, in *D. aspasia* and most allied species the light portions of the wings are in squarish blotches, especially in spaces 2 and 3 on the forewings; but in *Pareronia* and Papilionidae with the same general type of pattern the light portions are mainly in transverse lines! This distinction is very clear in my own Malayan specimens but not so obvious in Seitz, IX (Plates), as the colour details which now call for attention.

Of 42 Malayan Pierid species which I examined personally, fifteen were mainly coloured as follows, especially on the upper surface:—Yellow: 11 (*Dercas*, *Ixias*—1, 8 *Eurema gandaca*). Black or dark grey: 2 (2 *Delias*). Abnormal: 2 (*Appias nero*—red, *Pareronia* (male)—blue).

The remaining twenty-seven species were mainly or wholly white above in the males, as in many Holarctic "Whites" of both sexes. But the females of these tropical species vary greatly, some only being more or less white like the males. Many of them show, on their upper surfaces especially, a great deal of black or dark brown, more or less flecked or barred with white; many have conspicuous yellow patches; and both these non-white colours occur much as they do in the allegedly abnormal *Pareronia* females, the yellow, if present, being basal and mainly on the hind wings.

Yellow in Pieridae usually occurs in both sexes or in neither. But in *Delias georgina*, *Appias leis* (*melania*, F.) *distanti*, Moore, *Saletara panda distanci*, Butler, *Prioneris thestylis* and *P. clemathe* the female has yellow on the basal part of the hindwing above though the male has none; and in *D. ninus*, Wall., the female has more yellow in this area

than the male. Further, in several species which are partly yellow above in both sexes, for instance *Delias aglaia parthenope*, Wall., *Cepora lea*, Dbl., and *Catopsilia scylla*, L., this colour is again confined to the hindwings, as it is in both sexes of *Danaus aspasia*. In many species, which are white or black above, the under hindwing surface is yellow, e.g. *Delias hyparete*, L., *Appias lycida*, Cr., *A. lalage*, Dbl., and the males of *Delias georgina* and *Prioneris* spp. So it is evident that yellowness on the hindwings occurs in many Pierids which are otherwise mostly white or black, or both, and that in several species this yellowness is peculiar to the female sex above. Its occurrence in certain female forms of the Pierid *Pareronia* should therefore neither occasion any surprise nor call for any special theory as to its origin.

Black, dark grey, or partially black colouring is frequent in one or both sexes of tropical "Whites." Malayan species afford the following examples:—(i) Both sexes of *Delias aglaia* and *D. ninus* have the upper surface mostly black or very dark grey with whitish streaks and blotches; and, according to Seitz (IX, pl. 56), the same general effect is seen in both sexes of *D. thisbe* and *D. belladonna*. And in all these species the basal part of the upper hindwings is yellow, so their general colour scheme is similar to that of *Pareronia lutescens* females. Such butterflies, however, are seldom mentioned or figured by the mimetic school! (ii) The females of many species which otherwise show the general colouring of their males have much more black on upper marginal borders and, except in the all-yellow kinds, additional sub-marginal or discal black bars or spots. Among these species are *Appias nero figulina* (reddish), *Catopsilia*—all spp.—and *Hebomoia glaucippe* (mainly white), and seven, i.e. all species of *Eurema* (yellow) except *tilaha*, which has extra black markings in both sexes equally. (iii) In many species which are counted as "whites" in my rough classification by upperside wing coloration because the males are mainly white above, the females are much darker than their consorts. This result is achieved by greater development of black on margins and veins or by the whole upper wing surfaces being more or less darkened. This general darkening is strongly marked in *Delias hyparete*, *D. georgina* (and *D. descombesi* according to Seitz); *Udaiana cynis*, Hew; *Saletara panda*; and the two *Prioneris* species. It is especially striking in the last three, as they also have yellow on the hindwings above (Seitz, IX, pl. 57, 61). *Prioneris* and *Pareronia* females are very similar in upperside coloration, so *Pareronia* could be included here. It and they are also very similar to both sexes mentioned in list (i).

Amid so many Pierids which in one or both sexes have dark upperside coloration diversified with whitish streaks and spots, often combined with yellow on the basal parts of the hindwings, it is not surprising that one among many such patterns happens to approximate to that of the peculiar Danaid which sports the Pierid yellow in addition to the typical sober hues of its own clan. Actually, many Pierids show this resemblance. I think Fruhstorfer (Seitz, IX, pp. 120, 135) is right in deprecating the idea of mimicry in such cases. Many of the ordinary mimicry arguments break down:—1, He has pointed out that yellow *Pareronia* females occur in areas where none of their alleged "models" exist (o.c., p. 178) as well as in the haunts of yellow-hued *Danaida*. 2, It has been shown above that there is no basis in fact for the sup-

posed argument from the relative abundance of the females of these two genera (p.). 3, Further, as in most cases of alleged mimicry among butterflies, the underside resemblance of *Pareronia* and Danaids is less close, particularly in the normal resting position; the bodies of the former have none of the spots typical of Danaidae but are Pierine in colour. 4, The supposedly mimetic colours of *Pareronia* are simply those of a great host of its own family!

What is remarkable is that *D. aspasia* should have some bright yellow, as this colour is not found in other members of Danaidae in Malaya and only in a very few species anywhere else. It is the Danaid *aspasia*, which, according to various criteria of the mimetic theory, should be looked on as a Batesian mimic of a very big dark Pierid group with basic yellow, comprising the females of many species and the males of some of them. All that is claimed here is that one favourite example of mimetists is entirely misleading. The resemblances between various members of the Pieridae, Papilionidae, and Danaidae seem due to parallel development or convergence, as Bingham (1905, 12), Punnett (1915, 148-9), and Berg and Vavilov (Berg, 1926, p. 327 seq.) have argued.

The facts given for upper wing coloration in Malayan Pierids are supported by inspection of the 591 upperside figures of Indo-Australasian Pieridae in Seitz, vol. IX, plates 51-73. These may be summarized as follows:—(i) Black or some very dark shade is common as the main colour, Seitz showing 139 or 23.6%. It is however, usually diversified with white or grey blotches, spots, or streaks. (ii) The hindwings often have yellow on the basal region, even in species which have little or no yellow elsewhere; Seitz shows 227 or 38.5%, some of which have yellow on the forewings too. (iii) These colours may occur in both sexes; more often they appear in the females only, and the males are predominantly white or yellow, or, rarely, reddish or bluish. (iv) Mainly white coloration in both sexes, which is common in the fewer species of temperate regions, is seldom found in this important tropical-subtropical area.

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LONGITARSUS AERUGINOSUS, FOUDR. (COL. CHRYSOMELIDAE), A GENUINE BRITISH SPECIES.

By H. DONISTHORPE, F.Z.S., F.R.E.S., etc.

This species is not included in Beare's 1930 Catalogue; and evidently Tomlin and Sharp in their notes on the British species of *Longitarsus* (1911) did not regard it as a British species for they write (p. 282):—
 "We therefore cannot escape the conclusion that whether the insect

described as *L. aeruginosus* by Fondras was specifically valid or not, the specimens we take in this country on *Eupatorium* (the food-plant of '*L. aeruginosus*') or any other Composite are all of one species—*L. succineus*, Fowler."

Nevertheless this species is a truly British insect. Its first record as British appears to have been in 1904, when Newbery, in criticizing Bedel's *Faune Col. du Bassin de la Seine*, Vol. VI, states: "We appear to have *Thyamis aeruginosus*, Foudr." He gives a translation of Bedel's table to separate *L. aeruginosus*, Foudr., *L. pellucidus*, Foudr., and *L. succineus*, Foudr. Fowler and Donisthorpe (1913) also give the same table when recording *L. aeruginosus*, Foudr.

On 29th July 1909, I swept a *Longitarsus* in some numbers off *Eupatorium cannabinum* (Hemp-agrimony) at Luccombe Chine, Isle of Wight. This I named *L. aeruginosus*, Foudr., and the beetle has stood in my collection under that name ever since. Recently Dr Blair and I compared my specimens with one in the General Collection at the Museum, which had been named *L. aeruginosus*, Foudr., by Heikertinger, and found that they were identical. Subsequently Blair found that he had taken the species off Hemp-agrimony at Godstone, Isle of Wight.

It is a fine large quite distinct species, and does not agree with *L. succineus*, Foudr., or any other allied species. It is true that the apical cilia are easily abraded (this is the case with specimens in my series), but can be distinguished by other characters.

P.S.—On page 285, Tomlin and Sharp refer to a species which was introduced as *L. nigerrimus*, Gyll., as British by Joy and Tomlin on specimens taken by Dr Wallace at Grimsby. They admit that it was not that species, but suggest that it might be Dollman's *L. plantago-maritima*! This, however, was not the case. I went to stay with Dr Wallace at Grimsby in 1908, and we swept very many specimens of the insect in question, and they all proved to be different colour forms of the common *L. lurida*. Dollman's *plantago-maritima* is, of course, a quite good and distinct species.

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CURRENT NOTES.

DR DE LATTIN, whose name has become known to readers of *The Entomologist's Record* through his description of the Uludagh race of *Parnassius apollo*, r. *kossuigi*, has been granted complete exemption from military service, and returned from the Russian front. He is engaged upon research in the Brandenburg Mark.—M. B.

ENTOMOLOGY IN FRANCE.—In spite of the occupation, French entomologists are still producing good work. L. Chopard has described a totally new kind of earwig from an African cave, with the normal modifications of form, reduced pigmentation, reduction of the eyes, and extension of the members.

Dr René Jeannel, Professor at the Natural History Museum, has written a book entitled *La Genèse des Faunes terrestres—Elements de Biogéographie*, published by the Presses universitaires de France, 108, Boulevard St. Germain, Paris, in 1942. It runs to 514 pages and is illustrated with over 200 figures in the text and eight plates. The latter illustrate various phases of continental drift, which Dr Jeannel, like so many zoologists, looks upon as the golden age yet. He is also an out-spoken Lamarckian.

I hope later to be able to send further information on these two interesting and important works.—M. B.

PERSONAL.—Like many thousands, I have suffered the loss of everything that I have, from enemy action. If any friends would put aside any spare copies of entomological or general natural history books, or pamphlets, or of my own writings, for the happier days, when I hope to start again building up a little library, I would be most grateful.—M. BURR.

IN the past scientists have been exceedingly slipshod in their choice of words in passing on their new knowledge and new conceptions to others. The words chosen are often of that type which has long association with human phenomena, activities and conception, and when applied to other groups of animal life are generally misapplied in suggesting the workings of a mind of human character. Let us take as an example the word "mimic." To say that the Geometrid larva, which fixes itself on a birch branch and resembles a twig near it, "*mimics*" the twig, is utterly nonsensical, and is really endowing one of the stages of growth of a moth with the mentality of a human being. This use of the word "mimic" expresses an utter impossibility of course. The similarity in this fact of nature can be fitly called protective. The word "mimics" used thus really acts as a propaganda term and serves to give a false impression of active mentality to an immature stage of an insect, which it cannot possess. Moths sitting on tree trunks are, in the case of a large number of species, even to experienced eyes, quite invisible until disturbed. We cannot possibly describe the so-called "mimicry" in insects as aught but a case of "protective resemblance" and brought about by natural selection in the course of ages.

THE Insect Immigration Committee of the S.E. Union of Scientific Societies consists of Dr C. B. Williams, M.A., Sc.D., F.R.E.S. (Rothamsted Experimental Station), *Chairman*; G. F. Cockbill, Ph.D. (Cambridge University); Henry J. Turner, F.R.E.S., F.R.H.S. (*Entomologist's Record and Journal of Variation*); Mrs W. Boyd Watt, F.Z.S. (Hon. Sec., Zool. Sect., S.E.U.S.S.); Capt. T. Dannreuther, R.N., F.R.A.S., F.R.E.S. (*Hon. Secretary* of the Committee).

IN reports of sales in papers and magazines there is the report of a sale of Lepidoptera belonging to H. J. Turner. I have just had a letter

from a well-known entomologist abroad saying he would have been only too pleased to have been among the purchasers of my insects. The sale was for a collector of the same name and initials, and in no way mine. The auctioneers (Messrs Glendining) told those present in the room that the collection did not belong to Hy. J. Turner of the *Entomologist's Record*. I wish to state that I have never sold an insect and do not intend to have any go to the hammer. It has for some years been arranged that a large proportion go to the Hope Museum, Oxford, as arranged with the late Sir Edward Poulton, and since confirmed with Dr Hale Carpenter. Also the bulk of my rather extensive library will pass to the Royal Entomological Society, including numerous volumes which are historically interesting as having been used or owned by well-known entomologists of long ago and in some cases annotated by them.

PART 5, Vol. II, of the *Jr. Soc. Brit. Entomology* recently issued contains some two dozen short notes on the Biology of Insects of seven or eight Orders. There are eight notes dealing with Diptera of the families, *Syrphidae*, *Tipulidae*, and *Tabanidae*. The *Lepidoptera* are next with six notes including very late emergences of some Sphingidae, in the Bournemouth area; *Sphinx pinastri* and *Smerinthus ocellata* in October; and *Pararge megera* on a flint wall in October; Hants. There are three Notes on Odonata, one of which deals with the rearing of *Aeshna cyanea* and *Orthetrum caerulea*, and another contains records of six species in the Bournemouth area. There are only two notes on Hemiptera in this number. There is only one note on Coleoptera, and that is on the apparent (so-called Mimicry) in the case of the "Bee-beetle," *Trichius fasciatus*. It is a good feature of this publication that the mass of the matter consists of notes on observations made by amateurs, who are lovers of Nature, and not by professional workers with but little familiarity with insect environment in nature.

A CORRESPONDENT of the *Ent. News* has called attention to a comment in *Nature* on the publication of Darwin's volume on the "Variation of Animals and Plants under Domestication" in 1868, as the foundation of a new "ism," which is called "Darwinism," and asserted that the word "Darwinism" has become as familiar as "Galvanism" or "Mormonism." The writer in the *Ent. News* remarks that "with the passing of the years, the sole survivor, at least in common English usage, is Darwinism. Evidently the 'survival of the fittest' works as well for *isms* as for organisms, and despite its ups and downs, Darwinism sings to day as loudly and lustily as ever."

THE Annual Exhibition of the South London Entomological and Natural History Society takes place at the Chapter House, St Thomas's Street, London, S.E.1, on the afternoon of Saturday, 14th October 1944, and will take the form of a conversazione, at which will be displayed not only "varieties," but interesting specimens and collections of fauna and flora brought for exhibition by members and friends. Everyone interested in any branch of Natural History is cordially invited to attend. All friends are asked not only to come, but to bring similar exhibits and so contribute to making the meeting a success. Exhibits received from 11a.m. Meeting formally opened by the President at 2.30.

withstanding the black markings are quite recognizable. The fringes of the hindwing yellowish." ♀ Strasburg.

ab. *rectangularis*, Stephan, *Iris*, XXXIX, 19 (1925).

ORIG. DESCRIP.—"A very dusky example—a transition to *implicata*, Lef. The forewings are paler than in normal *occulta*, the orbicular is very large, the inner (basal) transverse line indistinct, the outer transverse line (which usually near the costal margin is only slightly bent) is distinctly angled, almost 90°; both the black arrow-shaped spots extend towards the inside of the waved line (submarginal) and point straight to the point of the angle. This is such a striking appearance that the name *rectangularis* seems quite appropriate." There is a specimen in the Burrows' collection which answers to this character exactly.

ab. *roseovirgata*, Dnhl., *Mitt. Münch.*, XIX, 106 (1929).

ORIG. DESCRIP.—"The inner half of the waved band, the outer limit of the discal area becomes of a light rosy-red colour. Here and there this colour becomes spots at the outer and lower half of the reniform stigma. The paler parts of the outer margin are also lightly suffused rosy." Silesia.

ssp. *fumea*, Drdt.-Stz., *Pal. Noct. Supp.*, III, 88 (1933).

FIG.—*l.c.*, plt. 10e.

ORIG. DESCRIP.—"Small with narrow wings, ashy-grey with sooty dusky-brown basal and marginal areas. In the latter the veins are pale and there are blackish sagittate marks before the subterminal line. Also hindwings are much paler." Ili territory.

ssp. *tibetica*, Drdt.-Stz., *Pal. Noct. Supp.*, III, 88 (1933).

FIG.—*l.c.*, plt. 10e.

ORIG. DESCRIP.—"Very large and with wide wings that are a monotonous smoky-grey with quite extinct transverse markings, and only the three large pale stigmata stand out distinctly in the dusky disc. Further there are three heavily black sagittate marks in the upper half of the subterminal. Hindwings very uniformly grey-brown with white fringes." Thibet.

ab. *semiconfluens*, Lempke, *Tijds.* (1939), 234.

ORIG. DESCRIP.—"The two stigmata are united by a double line, the encirclement of both being broken." Holland.

Aplecta, Gn. (1841: 1852), Dup., *Sth.*, Warr.-Stz., Drdt.-Stz.: [*Agrotis*, Och. & Tr. (1816-25), Culot: *Polia*, Ochs. & Tr. (1816-25), Steph., Frr., Hamp.: *Melanchra*, Hb. (1820), Meyr., Meyr.: *Mamestra*, Hb. (1821)] *nebulosa*, Hufn. (1766).

Tutt, *Brit. Noct.*, III, 68 (1892): Meyr., *Handb.*, 86 (1895): Barr., *Lep. Brit. Is.*, IV, 165, plt. 155, 1 (1897): Stdgr., *Cat.*, IIIed., 156 (1901): Splr., *Schm. Eur.*, I, 169, plt. 36, 13 (1905): Hamp., *Lep. Phal.*, V, 114 (1905: South, *M.B.I.*, I, 235, plt. 119, 1-5 (1907): Warr.-Stz., *Pal. Noct.*, III, 78, plt. 19c, d (1909): Culot, *N. et G.*, I (1), 98, plt. 16,

f. 15, plt. 18, f. 1 (1911): Meyr., *Rev. Handb.* 157 (1928): Drdt.-Stz., *Pal. Noct. Supp.*, III, 108, plt. 14i (1934).

Hufn., *Berl. Mag.*, III, 418 (1766), inadequately described a whitish-grey Noctua, *nebulosa*, thus: "Weissgrau, mit braungerändeten Flecken, darunter ein nierenform, niger oder braungrau mit weissgrauen Flecken."

Rott., *Naturf.*, IX, 143 (1776), in his Revision of Hufn. fully re-described *nebulosa*.

Schiff., *Verz.*, 72, H. 1 (1775), said it was the *polyodon*, L. (= *monoglypha*, Hufn.).

Illiger, *N. Ausg. Verz.*, I, 206 (1801), accepted this and as synonyms *thapsi*, Bork. & Brahm, and *bimaculosa*, Esp. He recorded the doubt Borkhausen had, whether *thapsi* was the *polyodon* of L. and of Fab.

Esp., *Abbild. Noct.*, IV, 2 (1), 405, plt. 132, 1-2 (1788-9-P), gave two figures named *bimaculosa*, ♂ and ♀. The ♀ a light *nebulosa* with complete and emphasized black transverse subterminal zigzag line. The ♂ a darker grey insect with very incomplete subterminal line.

Ernst & Engr., *Pap. d'Eur.*, VII, 89, f. 470a-c (1790), gave two excellent figures of this species, which they believed to be the *polymita*, L.

Donovan, *Brit. Ins.*, X, p. 345, 1 (1801), gave an excellent figure under the name *grandis*, which was dealt with later by Haw.

Hb., *Samml. Noct.*, 78 (1800-03), gave an excellent figure of a light grey form under the name *plebeji*.

Dup., *Hist. Nat.*, VI, 382, plt. 97, 1 (1826), gave an excellent figure of a moderately dark example, with much of the whitish-grey remaining in contrast, under the name *plebeja*, Hb., and he considered the *polimita*, Fab. (*Ent. Sys.*, II, p. 67) as a syn. In his *Cat.*, p. 130 (1844), he used the Genus *Aplecta*, Gn.

Treit., *Schmet.*, V (2), 48, remarked that very few species had met with so many errors in its identification either from its rarity or the absence of characteristic markings for distinguishing it. Hufn. was the first to note this species; Schiff. said it was *polyodon*, L., & Fab. followed Esper and was equally in error, with *bimaculosa*. Borkhausen and Brahm named it *thapsi*, while Hubner called it *plebeja*. Treit. then referred to Illiger's *Mag.*, Vol. II (1802-3), p. 87, where Laspeyres, in discussing the new *Verz.*, pointed out that *radicea*, Schiff., or *monoglypha*, Knoch, was the *polyodon*, L.

Stephens, *Ill.*, III, 28 (1829), described it as the *bimaculosa*, Esp., and *grandis*, Don.

Frr., *Beitr.*, II, 12, plt. 52 (1829), gave a rather poor figure and referred to the various errors of identification made by previous authors, but does not give the author of the name.

H.-S., *Sys. Bearb.*, II, 264 (1850) gave as synonyms *plebeji*, Hb., *bimaculosa*, Esp., *thapsi*, Brahm, and *polyodon*, Ill.

Stdgr., *Cat.*, IIIed. 156 (1901), gave *plebeja*, and *bimaculosa* as synonyms, and *robsoni*, *asiatica*, *askolda* and *nimbosa* as forms. He considered *askolda* as a large form of *asiatica*.

Hamp., *Lep. Phal.*, V, 114 (1905), recognized three forms: *robsoni*, Coll., *asiatica*, Stdgr., and *askolda*, Obthr., with *thapsi*, *bimaculosa*, *grandis*, *plebeja*, *lama* as synonyms.

Splr., *Schmet. Eur.*, I, 169, plt. 36, 13 (1905), gave a good figure but with too much brown suffusion. He dealt with *pallida*, *robsoni*, *asiatica*, *askolda*, *nimbosa* (N. America).

South, *M.B.I.*, I, 238, plt. 119, f. 1-5 (1907), gave five excellent figures of *pallida*, Tutt, *robsoni*, Collins, *thompsoni*, Arkle, and two of the lighter British forms.

Warr.-Stz., *Pal. Noct.*, III, 78, plt. 19c, d (1909) gave seven good figures, but all too dark grey compared with our British forms, ♂ and ♀ *nebulosa*; ♂ and ♀ *bimaculosa*, ♂ and ♀ *calabrica*, and *conspicua*, of which the last two were new. The figures are all too much alike to give apparent differences. They treated *thapsi*, Brahm, *plebeja*, Hb., and *grandis*, Don., Haw., as synonyms; *lama*, Stdgr., becomes *asiatica*, Stdgr. They also dealt with *pallida*, Tutt, *robsoni*, Collins, and *askoldi*, Oberthr.

Culot, *N. et G.*, I (1), 98, plt. 16, 15, and plt. 18, 1 (1911), gave two excellent figures, one of the ordinary grey form without any emphasis of the dark discal marking. Also he figured ab. *robsoni*, which he labelled an *Agrotis*.

Drdt.-Stz., *Pal. Noct. Supp.*, III, 108, plt. 14i (1934), added two fresh forms, both British, (1) ab. *thompsoni*, Arkle, and (2) ab. *plumbosa*, Mansb. They said, "To what degree these forms are identical with *robsoni* remains to be carefully elucidated."

Barrett discussed the Variations as follows:

Variation in this species is very considerable—apparently local or in some degrees climatal—and consists mainly in more or less suffusion of the ground colour with grey or smoky-black. In the South of England the ground colour is usually white, sometimes brilliantly so, occasionally with brownish clouding along the costa, in other instances rendered more extensively white, by partial obliteration of the transverse lines and shades, in which case the large stigmata become conspicuous. Away from the extreme South a clouding of darker, or a darkening of the markings, or both, very soon become manifest; even in Berkshire one wood will produce white forms in abundance, and another, but a few miles distant, equally plentiful greyer variations. This becomes intensified in the Midland and Northern counties, while both forms are mingled in the Eastern and Western, and the extreme is reached in Cheshire, where in the Delamere Forest region specimens are frequently obtained wholly suffused with smooth smoky-black and hardly presenting a trace of the usual markings, the stigmata being only indicated by paler clouds; While the hindwings are also smoky-black, but with the cilia white. This singular melanic form was discovered only a few years ago by Mr J. Collins, of Warrington, but has, I believe, been found every season since, and now is taken also in South Yorkshire. In the intermediate gradations of colour this obscuration of the markings is rarely visible—usually they are blacker than the grey or smoky ground colour. In a specimen taken near King's Lynn, Norfolk, the general dark colour and markings are relieved by slender white stripes in the places of the usual first and second lines. The intermediate grey tones of colour seem to prevail northward to a large extent, but a specimen from Sutherlandshire in Mr W. H. B. Fletcher's collection is of quite the whitest type, and others from Argyllshire are also white, but almost devoid of markings.

The Names and Forms to be considered :

- nebulosa*, Hufn. (1766), *Berlin. Mag.*, 418.
bimaculosa, Esp. (1789+?), *Abbild. Noct.*, IV, 403, plt. 132, 1-2.
thapsi, Brahm (1791), *Kalend.*, II, 135, 533, a Syn.
plebeja, Hb. (1800-3), *Samml. Noct.*, 78 (1800-3), a Syn.
grandis, Don. (1801), *Brit. Ins.*, X, plt. 345, 1 (1801).
grandis, Haw. (1809), *Lep. Brit.*, 185, a Syn.
nimbosa, Gn. (1852), *Hist. Nat.*, VI (II), 77. American.
r. askolda, Obthr. (1880), *Et. Ent.*, V, 79.
ab. robsoni, Collins (1890), *Ent. Rec.*, II, 264.
ab. pallida, Tutt (1892), *Brit. Noct.*, III, 68.
r. lama, Stdgr. (1896), *Iris*, IX, 254.
r. asiatica, Stdgr. (1897), *l.c.*, X, 534.
ab. thompsoni, Arkle (1904), *E.M.M.*, XL, 180.
ab. conspicua, Warr.-Stz. (1909), *Pal. Noct.*, III, 78, plt. 19e.
r. calabrica, Warr.-Stz. (1909), *l.c.*
ab. suffusa, Klem. Spraw (1911) *Kom. Krrys.*, XLVI (3), 11.
ab. plumbosa, Mans. (1917), *Ent.*, 50, 69.

Newman, *Brit. Moths*, 407 (1870), gave two figures, 3-4, depicting extraordinary forms.

I. A banded form in which usual dark central transverse shade is developed into a distinct perfect black band, with the orbicular completely white, with white basal patches on the costa and on the sides of the thorax. The general ground is light grey as in the normal form.

II. With a complete series of clear white chevrons on the outer margin of the forewings, outside the subterminal, which is represented by a strong black wavy line as also are the angulated and basal lines. The stigmata are obsolete. The general ground colour is light grey as in the normal form.

These were in the Bond collection which passed into that of Sydney Webb, which was dispersed at Stevens about 1920.

thapsi, Brahm, *Kalend.*, II, 135 and 533 (1791).

There are descriptions of the larva, pupa and life-history but not of the imago. The references are to *nebulosa* and *bimaculosa*. Brahm referred to it again, *l.c.*, p. 533, and gave View., *Tabell.*, II, 54, as a reference with the synonym *polyodon*.

plebeja, Hb., *Samml. Noct.*, 78 (1800-3), doubtless is the typical form as described (imperfectly) by Hufn. in the *Berl. Mag.*, III (1766).

ORIG. DESCIP. by Hb. Geyer, *Text*, 191: "Whitish-grey head and thorax more ashy-coloured, black marked. The wings suffused ashy-grey, with reniform and orbicular stigmata almost filled in, pale blackish-margined waved lines and a black streak placed in the anal angle. The hindwings ashy-grey."

The syns. *nebulosa*, Hufn., *thapsi*, Brahm, *polyodon*, Schiff., and *bimaculosa*, Esp., are quoted.

grandis, Haw., *Lep. Brit.*, 185 (1809).

ORIG. DESCIP.—"Alis albicantibus nigro varie undatis: stigmatibus magnis subocellaribus, litura prope angulum posticum nigrum." Donovan, *Brit. Ins.*, X, 345 (1801). "Thorax cristatus canus, nigro

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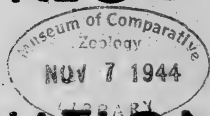
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MIDDLE EAST LEPIDOPTERA: NEW FORMS AND SPECIES. VI.

13,820

By E. P. WILTSHIRE, F.R.E.S.

This paper may be regarded as a successor to "New Lepidoptera from S.W. Iran" and "Some More New Lepidoptera from S.W. Iran," by the same author, which appeared in *Journ. Bombay N.H.Soc.*, Vol. xlii, August 1941, and Vol. xlv, Part 2, December 1943, respectively. It deals in part with the same district, in part with the opposite shores of the Persian Gulf, around Kuwait and Basra.

Chondrostega subfasciata, Klug., **brunneicornis**, Wilts., ssp. n. (Fig. D.)

♂:—Frons with 3-pointed dark brown process.

Antenna heavily bipectinated, the lamina being brown of a variable hue; only in one specimen can the word "pale" (used by Klug of the antenna of typical *subfasciata*) be used, but the antenna of this one would be best described as "pale cinnamon." In all the others the laminae are cinnamon-brown, and in one example at least, dark chocolate-brown.

Fore-tibia with spine shorter than half the length of the tibia. This character agrees with *subfasciata* and definitely separates the present moth from *longespinata*, Aur. (which, moreover, was described as having grey antennae).

Forewing lightly scaled, glossy, parchment coloured; not clear white, as in *feisali*, Wilts. Nervures and margins, cinnamon. Upperside unmarked except in one example, in which the central fascia alone is present; *subfasciata* was described as having two obsolete fasciae. When present, the central fascia is grey and diffuse, wavy oblique and obsolete. Fringes hardly chequered (another difference from typical *subfasciata*).

Hindwing, as forewing. In the well-marked example, the grey fascia is almost entirely obsolete.

Underside, both wings, as upperside, but with fasciae rather less obsolete. In no example is the median fascia complete, but in several it is more traceable than on the upperside; moreover, in one or two examples, slight grey traces of a diffuse submarginal fascia are visible. Expanse, 28-31 mm.

Holotype:—♂, *leg.* Mrs V. Dickson, 28.x.43, water-well 13, Hamatiyat, Kuwait, E. Arabia. In coll. m. An unmarked specimen.

Paratypes:—♂♂♂♂, same captor, date, and place. In coll. m. Among these is the well-marked specimen.

Klug's type in the Berlin Museum was examined by Aurivillius about 1894 and is inaccessible to the present author. The possibility therefore remains that *brunneicornis* is specifically distinct, but from a careful comparison of my series with the original descriptions of Klug and Aurivillius I think it more probably a good subspecies of Klug's Egyptian species.

Hamatiyat is in the Shaqq depression some 50 miles S.W. of Kuwait town. *Brunneicornis* also occurs at Manaqish about half-way between Hamatiyat and Kuwait town. It does not appear to inhabit the coastal desert near the town. The habitat is Hamdh desert, of the "Rimdh" type; i.e., not a *Rhanterietum* (*Rhanterium epapposum*, or "Arfaj"); "Rimdh" is probably *Haloxylon salicornicum*). Whether

brunneicornis is really restricted to *Haloxylonetum* remains to be seen. Phytogeographically the habitat is Saharan-Sindian.

(N.B.—*Chondrostega aurivillii*, Pungl., ssp. *feisali*, Wilts.

(First description:—*Journ. Bombay N.H. Soc.*, Vol. xlii, 4, December 1941; figured in *The Butterflies and Moths of Iraq*, Special Bulletin, Directorate-General of Agriculture, Bagdad, 1944), a race occurring in Iraq and Kuzistan, also occurs on the same Kuwait habitat as *brunneicornis*, two examples being taken by Mrs V. Dickson on the same date, to light. This species occurs on several types of desert biotope, though never on alluvial desert. It is considerably larger than *brunneicornis*, being perhaps the largest and most handsome member of the genus.)

Autophila cymaenotaenia, Bours., ssp. **orthotaenia**, Wilts., ssp. n.
(Fig. E.)

The following description enlarges on a brief preliminary description appearing in the author's *Butterflies and Moths of Iraq* (Bagdad, 1944); an illustration is also supplied.

This race differs from the N. African nymotypical form by the rosier colour of the forewing upperside, and the straighter course of the hindwing's median band.

Holotype:—Habbariyah well, Kerbela desert, Iraq (*leg.* Diamond, 4.v.37) in coll. m., but in temporary custody of M. Charles Boursin, Paris. M. Boursin examined the genitalia of this specimen, and mentioned it in his work: *Beitrag zur Kenntnis der Agrotidae-Trifinae*, xxiii (*Mitt. Muench. Ent. Ges.*, e.v.xxx, Jahrg. 1940, Heft 2) in which *cymaenotaenia* was first described and illustrated; he remarked on the rosier colouring but, doubtless for lack of further material from Asia, gave no name to it.

Allotype:—♀, water-well 13, Hamatiyat, Kuwait, E. Arabia (*leg.* Mrs V. Dickson, 28.x.43), in coll. m.

Paratype:—♂, Burqan, 30 miles S. of Kuwait town, E. Arabia (*leg.* Mrs V. Dickson, 24.xii.43), in coll. m.

These two examples, which resemble the Iraq example seen by M. Boursin, justify the naming of the Asian race. They also show that this species has two broods, a fact not known before.

Boarmia ghirshmani, Wilts., sp. n. (Fig. A.)

This species somewhat resembles the little-known *Boarmia tenuisaria*, Stgr. (= *tenuisaria*, Alb. & Warn. nec Stgr.). A good photo of the type of the latter was published by Albers and Warnecke in *Mitt. Muench. Ent. Ges.*, xxxi, Jahrg. 1941, Heft 1. The differences, as far as it is possible to describe them in the absence of a male of the new species, are as follows:—

- (A) *tenuisaria* is autumnal, flying in November.
ghirshmani is vernal, flying in March-April.
- (B) *tenuisaria* belongs to the *Lycietum* of the Iraqi plain, an oasis biotope; in Palestine (the type-locality) it probably belongs to a similar biotope. Foodplant: *Lycium barbarum*, L. The moth is locally common.
ghirshmani belongs to the *Amygdaletum* of the South Zagros Mts. It is euryoecous in the scrub zone and scarce.

- (C) *tenuisaria* ♀ forewing has a paler, i.e., less black-powdered median area, the dark shades being basad of the first line and terminad of the second line.
ghirshmani ♀ forewing has the area between the two lines more heavily powdered with black scales and no darker shades outside the area.
- (D) *tenuisaria* (♀ forewing)—the submarginal shade begins from the outer border well below the apex and then runs to the middle of the inner border, close to the outer line.
ghirshmani ♀ forewing has no such shade.
- (E) *tenuisaria* (♀ forewing)—the black outer line is obsolete near the apex, but is acutely angled in the neighbourhood of nervure 8 and reaches the costa 2 or 3 mm. from the apex.
ghirshmani (♀ forewing)—the black outer line is clearly defined throughout and slightly wavy but not acutely angled; it reaches the costa about 1 mm. from the apex.

For the rest, the reader is referred to the plate, which shows both species. They are of similar size.

ghirshmani typical material and data are:—Holotype, ♀, 21.iii.41, Shapur Gorge (Tang-i-Chugan), near Kazerun, Fars, 3000 ft., in coll. m. Paratype, ♀, 7.iv.40, Pireh-Zan woods, 7000 ft., Fars, S.W. Iran, in coll. m. Both these specimens were taken on the wing at night in the vicinity of *Amygdalus* (wild almond) bushes, on which probably the species feeds.

Named in honour of M. Roman Ghirshman, the French archaeologist, and Mme. Ghirshman, in grateful recognition of their hospitality at Shapur at the time of the capture of the holotype. M. Ghirshman was charged by the Louvre with excavating the Sassanian city of Shapur. The author wishes here to acknowledge also with thanks the receipt from Mme. Ghirshman of some interesting specimens of Lepidoptera taken at light at Shapur and later at Kabul, Afghanistan.

Staudinger's original description of *tenuisaria* (*Iris*, xii (1899), p. 394, Taf. v, Fig. 3) was made from two males, whose span was given as 25-26 mm. The Basra female therefore, taken on 26.xi.43, becomes the **neallotype** of *tenuisaria*. It is partly described above, and this description is supplemented by the accompanying photograph (Fig. C) and the following comparison between it and its male:—It is generally similar in facies to the male, though the markings are less contrasted; the antenna is simple, that of the male is strongly bipectinated; span, 27 mm. It seems to fly less than the male and is therefore less often caught. Staudinger's original figure of the male is most unsatisfactory; so is that in Seitz, Vol. iv. Neallotype in coll. mea. (Fig. C.)

My Basra series of *tenuisaria*, Stgr., seems to be the first recapture since this moth was originally caught in Palestine on 7th November and 5th December 1898.

The early stages of *tenuisaria* are described, in the author's "Early Stages of Oriental Palaearctic Lepidoptera, VII," which follows with a single plate which illustrates both articles.

BITHYNIAN MT. OLYMPUS.

By MALCOLM BURR, D.Sc., F.R.E.S.

This isolated mountain between the ancient city of Brusa and the site of Troy may have lost in romance by becoming Uludagh, which is the Turkish name for it, but it has gained immensely in accessibility. Thanks to the enterprise of the Brusa Alpine Club, there is not only a regular motor bus service up the mountain in the summer, but a small hotel, clean and friendly, at about 1750 metres.

That made it possible for me to take advantage of a week's leave and spend the time up the peak, when I had the pleasure of being joined by Professor Kosswig, of the Faculty of Zoology in Istanbul University, with his assistant, Dr Recai Ermin, and half-a-dozen young Turkish students, whose keenness was a delight.

We rattled up in fine style through the zone of chestnut and hazel, then spruce and Aleppo pines, and soon came to the first juniper. The little hotel is on the northern flank of the crest, among open slopes with scattered stunted juniper, patches of wiry grass, mostly moistened by a number of springs, and backed by a forest of the Bornmüller's pine, which is endemic. Dotted about here and there were tall spikes of a curious yellow foxglove, *Digitalis ferruginea*, and a mullein, *Verbascum olympicum*, both also endemic. This was promising.

The Orthoptera fauna is not rich. During the week I was there I found nine species only. These were: an *Ectobius* sp., which I found by sweeping near the peak, at an altitude of at least 2000 m., but it escaped through a hole in the net and flew away. The other species were as follows:—

Myrmeleotettix maculatus, Thunb., rather surprised me by occurring in swarms on the patches of close turf near the numerous springs.

Stenobothrus fischeri, Ev., was very abundant in clumps of the coarse grass, *Deschampsia flexuosa*, or *Aira caespitosa*. They started climbing up the stems of the grass in the late afternoon, females greatly predominating, in such numbers that they suggested the incipient swarming of locusts. In one quite small clump of the grass I counted 43 specimens.

Chorthippus apricarius, L., occurred sparingly on the grass, and *Ch. cf. biguttulus*, L., here and there among the pines.

Although the ground seemed suitable, there was no sign of *Oedipoda* or *Acrotylus* so high up, but there was one more interesting Acridian, and that was *Nocarodes burri*, a hitherto unknown species to be described by Dr Uvarov. The clumsy females were common enough on the ground near the juniper bushes, but I found only two males; larvae were common enough, varying in colour much more than the adults, sometimes being almost white. The males are chocolate-brown when alive, relieved with buff; the dorsum is buff, the ventral segments being half black and half buff, giving it a striped appearance. The neck membrane is very dark, with a tinge of indigo; I could not detect the mysterious glandular spot. I was very glad to find this, as in my heart I had expected to do so. *Nocarodes* is an interesting genus of apterous Pamphagines. There are a number of very localized species.

Among the Tettigoniids there were *Poecilimon anatolicus*, Ramme, closely related to *P. bosporicus*; the coloration is slightly different, the

pronotum being deep red, black posteriorly, the side flaps green, yellow posteriorly; the dorsum is green, each segment brown at the base; the anal segment wine-red, the subgenital plate yellow. This coloration, noted from the living specimens, is worth recording, as it is fleeting.

Another Phaneropterid was an undetermined species of *Isophya*, a handsome fellow, with black the dominant colour in the male. The pronotum is vinous red, and also the elytra; the dorsum is banded with greenish black and pinkish white, the flanks dark green.

The only other Tettigoniid was a small, nimble Decticid, reminiscent of *R. roeselii*, and certainly very similar to *Metrioptera*. This turned out to be *Anterastes anatolicus*, described by Uvarov from a single female from Orhaneli, a village on another part of the mountain, at a lower elevation. It was numerous in places among bunches of wiry grass and in the juniper.

In cleaning the *Nocarodes*, I found 53 eggs in one, 57 in another. In a third the eggs were reduced to a yellow pulp by four big Tachinid larvae, while another contained a single one. These larvae are wonderfully vital; directly they were exposed, they started crawling hurriedly across the table, and survived the night in a box without apparent reduction of vigour.

On 27th August we went on an excursion up to the peak itself. After about three miles along a gently rising track, we struck uphill at right angles, to top the ridge, through juniper ankle deep, with the *Anterastes*, *Poecilimon*, *Isophya* and *Nocarodes* all fairly common, until we topped the crest itself. Here the change was abrupt. In front of us was a gently undulating saddle of white marble, dazzling in the sunshine; there was very little vegetation, consisting mainly of cushions of *Acantholimon echinus*, L., with charming little flowers; the pretty pink corolla is blown away and sails down wind, coming down like a parachute, but leaving a little mauve calyx, veined with a deeper tint. The leaves look soft, but are deceptive, for they are as stiff and prickly as wire, as I found out when I sat down on one.

To our left there rose a massive hummock, the peak itself, rising to 2550 metres, surpassed by a second peak a mile or two further on, tipped with basalt, which reaches 2590 metres.

As I trudged up the footpath that leads to the ski-ers shelter on the very top, I noticed a white butterfly dashing swiftly past. I succeeded in catching it, to find, to my surprise, that it was a *Satyrus*, bleached almost to the whiteness of the rocks around. Further on, a bigger white butterfly sped across the track, which was caught by one of my young Turkish friends. I gazed at it with admiration, for it was more than forty years since I had seen a living *Parnassius*, the last time being on the Montenegrin Durmitor.

Professor Kosswig explains to me that this Olympian race had been discriminated by de Lattin a year or two previously, and was *P. apollo*, ssp. *kosswigi*, a translation of the original description of which has recently appeared in the *Ent. Record* (1944, pp. 57-58).

We sat and chewed our lunch at the foot of the hut. The scenery was magnificent, for we could look down upon both northern and southern flanks. The latter is much steeper, in places dropping almost sheer for a thousand feet or more. The trees, *Abies bornmülleri*, climb higher up on that more sheltered side: beyond, a rugged, brown, sunburnt

country, while away to the south-west we could see the shimmering waters of Lake Apollonius. A little further, but not visible to us, was the village of Hisarlik, better known to us under the name of Troy.

The weather was equal to the scenery, for the sky was spotless but for the black speck of a *Vultur monachus* poised at an immense height, and, wonder of wonders, the air was still. Kosswig told me that he had been up here often, but never before known a day without a wind, and usually there was a gale; on his last visit, he said, the wind had blown his lunch away while he was eating it. For this stillness I was profoundly thankful, for down on the Bosphorus the unceasing wind had been a torment to me through three summers.

The rock was weathered into small stones, with only here and there one big enough to invite turning over. When I did so, I found the local myriapod, *Brachyiulus ulunus*, Verh., and several clusters of *Coccinella 7-punctata*. To my astonishment, I found a cluster of *Anterastes anatolicus*. This was a most unusual place to find a Dectid, but up here there were no bushes for it, nor even grass, and it is difficult to see how or why this flightless cricket had climbed so high.

Bird life was not much in evidence. An eagle soaring, a dorsal aspect of a kestrel hovering was all we noticed on top. To our left we had passed a cirque, haunted by Alpine chough and water pipits (*Anthus spinolettus*).

Here and there in the saucer separating the two peaks were patches of sandy flats, with close turf, decorated with tall purple thistles, golden-crowned everlastings, *Helichrysum orientale*, and a tall, yellow Composite, with a stunted forget-me-not and a queer little garlic, with gold and purple bunch of flowers, *Allium flavum*. The big thistles were all haunted by big bumble bees, while in one small patch my eyes were fascinated by a dozen or more of those magnificent *Parnassius apollo*, revelling in the honey. On the sandy patches there were *Cicindela* sp., very active in the sun and difficult to catch. The only grasshopper I found here was a single specimen of *Myrmeleotettix maculatus*, that was forming the dinner of a small black spider under a stone.

Here and there were a few patches of shrubs, flattened and stunted. These were a *Daphne*, clinging to one of which I found a pair of *apollo* in copula, and the other juniper, haunted by a few *Anterastes*, which interested me because, when chased, they took refuge under stones.

A few days later we returned to the marble saucer, but, leaving the peak on our left, struck across it, and topped the ridge, to descend a little way down the southern flank. It was an impressive scene, as the abyss was profound and steep, the walls supported, as it were, by a series of rocky buttresses capped with the pine. I stopped on the top of one of these and waited while my younger friends climbed down a thousand feet or more to see a famous waterfall.

It was a charming spot, where I lay and basked, watching the birds and insects around. There were several flowers left, such as the massive spike of *Gentium flavum*, as high as a foxglove, a few big spikes of *Verbascum*, and various unfamiliar shrubs and flowers, studded with a few stunted Bornmüller's pines.

Anterastes anatolicus was numerous here, more so than at the lower level near the hotel, and there were plenty of the *Poecilimon*. These seemed to be all teneral, which is surprising at the very end of August,

for along the Bosphorus they are over at the beginning of July. There was no short turf for *Myrmeleotettix*, but among the pines were a grasshopper that I considered *Chorthippus biguttulus*, L. While sweeping among the low shrubs, I found a male *Ectobius* in my net. I was surprised, and it was too quick for me, for it took to wing and was gone in a flash, an unexpected trick on the part of a cockroach. I worked very hard to find another, but without success. This was a pity, as it seems an unusual locality and altitude.

There were plenty of butterflies, too. A few *P. apollo* straggled down from the white marble to greet me, and a small *Argynnis* came up, while there were a fair number of a small, rather dingy *Lycaenid*. I sent them to Mr Wheeler, who thinks they may turn out to be interesting.

Bird life was well in evidence. A large flock of bee-eaters was hawking all around. One does not often see these lovely birds, for on the Bosphorus they appear on the spring and autumn migration, though I am told they spend the summer on the shores of the Marmora. A fly-catcher, I think our common species, was hawking off a dead branch of a pine near me, while a Bonelli's warbler and serins visited the mulleins. An unfamiliar thrush, with very pale breast, paid me a pop-visit, while in the sky a kestrel was hanging, and an eagle sailed by in dignity. I believe it was the golden, though Kosswig saw *A. clangula* lower down.

A week's leave slips quickly by, my first for four years. We spent our last evening dining in the students' camp, in a clearing, at the foot of a huge granite boss. Just beside their camp was a patch with a colour scheme unusual in nature. I found it was a bed of everlasting, with grey-white stalks and leaves, crowned with golden, while here and there among them grew an immense sorrel-stalk, leaves and fruit all deep red.

It was a magnificent evening, with brilliant moon and cloudless sky. In the far distance a forest fire added a touch of grim beauty. As we sat, wondering at the silence of the forest and apparent lifelessness, we saw three large birds outlined like black silhouettes against the emerald sky of the dying daylight.

"Buzzards!" exclaimed Kosswig.

"Never!" said I, "they must be owls."

I called them by hooting on my hands, and in a moment three brown owls flew up, circled around our heads, sat a moment on a pine to watch us, then, coming to the conclusion that we must be humans, they vanished as silently as they had come.

That day had been a *bairam*, or public holiday, so the bus had not come up to fetch us. The next day was a *bairam* too. I could not overstay my leave, so we hired a woodman's donkey to carry our kit, and we tramped down on foot.

We took it easily, but when, after seven hours tramping, we arrived in Brusa, we were tired and thirsty. I flung myself upon an armchair in the Luka Palace Hotel, and called for beer to drink and water to wash in.

But the Luka Palas Hotel could provide neither!

The interesting point about these few Orthoptera is that there is nothing strikingly Anatolian about them. The *Ectobius* is a member of

a purely European genus that extends northwards to Lapland. The four grasshoppers are of *Angaran* (Siberian) origin, and they must be near their southern limit of distribution, especially *M. maculatus*, which is a northern form. True, *Poecilimon* and *Isophya* are genera that appear to have arisen in Anatolia, but they extend well into Europe, even to Western Europe. The only Dectid, *Anterastes*, is more European in connection than Anatolian, for the only other two members of the genus (I write from memory), are one in Serbia and another in the South of France.

Nocarodes is an eastern, Levantine and Caucasian genus, which, like *Poecilimon*, *Isophya*, and other apterous genera, "pulverised," to use Jeannel's expression, into a number of isolated species, but is not by any means peculiarly Anatolian.

The same relations are borne out by the Olympian race of *P. apollo*, *kosswigi*, which de Lattin states is closer to the form of *Thessalian olympus* than to the rather numerous other forms characterising various mountains in Anatolia.

SUBSTITUTE FOOD-PLANTS.

By FRANK BALFOUR-BROWNE, F.R.S.E., F.R.E.S.

I was interested in a note on this subject by E. P. Wiltshire (1943, 55: 78-85) and now a further note on the same subject has appeared (1944, 56: 74-78). But neither of the authors defines what he means by substitute food-plants. Caterpillars will feed on various plants, but will not necessarily do so at all stages of their existence, nor can they complete their metamorphosis on all the plants upon which they will feed.

My experience with the Little Eggar (*Eriogaster lanestris*, L.) is to the point. I succeeded in rearing moths from larvae hatched and fed upon elm, birch, willow, rose and laurel. Egg-masses placed upon willow hatched and some of the larvae survived to the second stage. Older larvae fed on willow, if sleeved upon it, but did not pupate. Larvae about the second or third stage grew well on hazel and filbert but never formed a cocoon.

The experiments in America with the Gipsy Moth (*Oenieria dispar*, L.) also showed that caterpillars would feed readily upon certain plants but could not complete their metamorphosis. On some foods only males hatched out.

Therefore a list of food-plants for a particular species requires more detail than is given in the two notes in the *Ent. Rec.*, but such a list indicates the possibilities for research as to (1) how many of these plants are "perfect" foods and (2) for those interested in bio-chemistry, why are some plants only suitable at certain stages in the life of the caterpillar? Anyone interested in the subject should refer to Mosher's paper on the "Food Plants of the Gipsy Moth in America," *U.S. Dept. Agric. Bull.*, CCL, 1915.

Brae, Dumfries, August 28, 1944.

SUBSPECIES OF MELITAEA DEIONE, GEYER.

By Brigadier-General B. H. COOKE, C.M.G., C.B.E., D.S.O.

In the "Revision of the *athalia* group of the genus *Melitaea*," by Dr Verity, published in the Transactions of the Royal Entomological Society of London in September 1940, the author includes the following "race" of *Melitaea deione*:—

M. deione, Geyer race (?) *espunaensis*, Korb.

His description of it is as follows:—

"This name, which has hitherto been completely overlooked, was given by Korb to a very large race from the Sierra de Espuña (Province of Murcia), described as having very variable females with a broad light yellow central area and strongly curved and dentated transverse lines, so that it is said to differ greatly from the race of the Sierra Alfacar of Andalusia. Whether the insect which Korb had before him was in reality a form of *M. deione*, Geyer, or a form of *exerge helvetica*, Ruhl, of *M. athalia*, Rottenburg, it is impossible to say from his description. This race is here provisionally retained under the first-named species."

In 1927 I made a long stay in South Spain and collected this species at Granada, in the Sierra de Espuña and in the plains around the city of Murcia, and have good series from these localities, where I found it abundant and in two generations. When I visited the Sierra de Alfacar in mid-June I saw no *deione*. If the species flies there, the first generation was already over.

Dr Verity describes the Andalusian form (which presumably includes that of Granada) under the name of "race" *nitida*, Obth., and enters into a rather involved discussion as to whether it is a race of *M. deione* or of *M. athalia*.

All the insects of this *Melitaea* group which I took either at Granada, at Murcia or in the Sierra de Espuña were identical in form, and unmistakably belonged to a subspecies of *deione*, the females more or less agreeing with Korb's description quoted above. I saw no species of *Melitaea* anywhere that could have been mistaken for a form of *athalia*.

I consider, therefore, that the *deione* from Murcia, the Sierra de Espuña, Granada, and doubtless other districts in Southern Spain, should all be included in one subspecies, presumably *nitida*, Obth.

Dr Verity, in his "Revision," apparently uses the terms "exerge" and "race" for what most other authors consider "species" and "subspecies," which adds to the complication.

Others besides me have collected in the Sierra de Espuña, and it seems a pity that Dr Verity did not collect further evidence before including a separate "race" of *deione* on such slender grounds.

86 Osborne Road, Windsor, September 12, 1944.

AEGERIA BEMBEICIFORMIS ON RHUM.—For the first time we have encountered larvae of this species on our island expeditions. It had attacked and destroyed an example of *Salix viminalis* just in front of our "camp."—J. W. HESLOP HARRISON, Isle of Rhum.

COLLECTING NOTES.

A *ZYGAENA* COLONY.—On 14th July a young local collector, Philip Hughes, told me that he had caught a Yellow Burnet; this proved to be *Zygaena filipendulae* var. *flava*.

On 16th July, he took me to the spot which was a small clearing in Epping Forest, not more than 50 yards by 30 yards, and in this small place *filipendulae* was common. After half-an-hour's search, he had found another yellow one, and I had found two more, and then, to my amazement, I caught a beautiful var. *chrysanthemi*. On 20th July one more yellow one was taken, and then no more fresh specimens seemed to emerge.

Dr Cockayne tells me that he has never heard of these two varieties occurring in the same colony, and as this one is so small, I look forward to next year to see what it brings forth.

Among the colony, I found a few *Zygaena lonicerae*, and as I found two or three *filipendulae* with the sixth spot only the size of a pin-point, I suspect that these are hybrids.—A. RUSSELL JAMES.

ALTERNATIVE FOODPLANTS.—With reference to the notes on alternative foodplants appearing in the *Ent. Record*, perhaps the following may be of interest. In August 1943, I took two female *Anaitis plagiata*, and the larvae of both broods were fed till late autumn on *Hypericum perforatum*. Being kept in a sheltered spot, the larvae became active at the end of February 1944, and as no *H. perforatum* was available, I tried them on *H. calycinum*. This they would not touch, but readily ate another cultivated species, whose name I am not sure of, but which grows to a height of about three feet.

When *perforatum* was available later on, I gave this to them, but they refused it, and ate the cultivated species until full fed.

Unfortunately all the larvae died then, possibly due to a change of foodplant; as there were ova of two ♀s, this seems a possibility.—A. H. SPERRING.

OCCURRENCE OF *ACRYDIUM SUBULATUM*, L. (ORTHOPT.) IN BEDFORDSHIRE.—I first found this rather local ground hopper on 16th April 1944 in a sandpit at Fancott, a small village five miles from Luton, on gault. I have subsequently caught large numbers of this species in the same locality on two occasions, 23rd and 26th of the same month.

In this species the pronotum and wings extend beyond the hind knees, while in the other two species of this genus occurring in Britain the pronotum and wings are much shorter. The measurements of the specimens captured are as follows:—♀—Length of abdomen, 7-8 mm.; length of pronotum, 11.5-12 mm.; length of elytra, 1.5-2.5 mm. ♂—Length of abdomen, 5 mm.; length of pronotum, 9 mm.; length of elytra, 1.5 mm.

Unfortunately, only one male was captured, but several females, of which the mean sizes are given, were caught.

The wings and pronotum seem longer in comparison with the abdomen than suggested by Dr Burr in *Brit. Grasshoppers and their Allies*, but so far as I can see the edges of the fore femora are straight, and so presumably it is not a foreign species.

The habitat in which it was taken is typical for this species. The sand is completely waterlogged throughout the year and is at times covered with water. The whole of the area is covered with *Typha* and the mud contains large numbers of filamentous algae (mainly *Spirogyra*) and a few unicellular species which are unidentifiable. On these algae it presumably feeds (see *Brit. Grass.*, etc.).

Dr Burr also says it is never found far away from water, and this is certainly true in this case, as there is also a large permanent pond nearby.

A number of varieties occur in the pit, of which the most common is one in which the colour is reddish-brown, distinct from the usual speckled-brown appearance of the species. Another variety has large grey areas on the top and sides of the pronotum. I believe its song to resemble the squeaking of a shrew, but of this I am not sure. Its song is not mentioned in Dr Burr's book.

Another locality where it may occur is Flitwick Marsh, further north from Fancott, but I have no record of it from there.

Other records for the county not noted in Dr Burr's book are:—*Stenobothrus lineatus*—Chalk downs (common), Barton and Pegsdon; *Omocestus viridulus*—Chalk downs, Luton; *Conocephalus dorsalis*—Flitwick Marsh.—B. R. LAURENCE, 31 Sherwood Road, Luton, Beds, 24/4/44.

THE TENANTS OF AN ISOLATED BUSH OF *SALIX ATROCINEREA* ON THE ISLE OF RHUM.—On 8th August we went to Camas Pliasgaeg to examine a cave known to contain a kitchen midden. Just to the west of the cave, jutting out from the cliff and overhanging the storm beach, was a single bush of *Salix atrocinerea* which appeared to be well eaten. Almost at once the sight of a full grown larva of *Amorpha populi* indicated one species responsible for the damage, and further search of the bush revealed the presence of four more larvae and two ova of the same species. Curiously enough, whilst four of these larvae were of the bright green form, the fifth was of the whitish-green variety so often found on *Salix caprea*. In addition, one larva of *Hydriomena ruberata* was taken, a species more often encountered in the north of the island near Shamhnan Insir. In the Hebrides, one grows accustomed to find *Abraxas grossulariata* attached to all kinds of unusual foodplants, so that no surprise was felt when six batches of eggs of that species and numbers of young larvae were also detected. Needless to say, the spun shoots contained the ubiquitous *Peronea hastiana* larvae. Of species other than Lepidopterous, there were two batches of the sawfly, *Croesus septentrionalis*, one nearly full grown and well dispersed, and the other newly hatched. Of the gall-making sawflies, *Pontania pedunculi* was in fair numbers, as was also one of the leaf-rolling forms. It seems difficult to understand how these insects, especially the *A. populi*, manage to maintain themselves, firstly, because of the position of their single foodplant and, secondly, because the larvae and pupae must be exposed to drenching spray, and even waves, throughout the winter months.—Professor J. W. HESLOP HARRISON, F.R.S., Isle of Rhum, 10th August 1944.

BOARMIA RHOMBODARIA AND GONODONTIS BIDENTATA ON THE ISLE OF RHUM.—These two species are, of course, common enough generally;

nevertheless, both are distinctly rare in the Small Isles Parish of Inverness-shire. In fact, this is the first occasion on which we have noted the first-named, although the second has been beaten freely enough as larvae from birch and alder. However, to-day has been very stormy, and rain driving in from the south-west has made survey work impossible. After performing the usual essential duties, therefore, we have been reduced to playing squash rackets (on Rhum!). Around the coast, webs of the spider, *Ciniflo fenestralis*, yielded examples of two species named above in a mummified condition; but were quite typical.—J. W. HESLOP HARRISON, Isle of Rhum, Inverness-shire.

FLOWERS VISITED BY *BOMBUS SMITHIANUS*, WHITE.—This season so far neither queens nor workers of *B. smithianus* have been really plentiful although both have been observed at flowers of *Erica cinerea* and *E. tetralix*. To-day, at 9 p.m. (D.S.T.), despite the gale and heavy rains, I observed a worker of the species very assiduously probing flowers of *Tropaeolum majus*, which it left occasionally for *Lobelia* blossoms. I disturbed it several times, but it returned persistently until I was forced to leave. This is only the second occasion on which I have noted *B. smithianus* in the Kinloch area.—J. W. HESLOP HARRISON, Isle of Rhum.

NEPTICULA ANOMALELLA ON WILD ROSE IN THE ISLE OF RHUM.—One of the special groups allocated to me for study during the course of our Hebridean expeditions is the wild roses. The shrubs, although much more plentiful in the Western Isles than is generally imagined, are very local. Two days ago, on a cliff about half-a-mile west of Creag na h-Iolair, I observed a rose growing from a perpendicular crevice. Naturally, I climbed to it for specimens and found it to be a well-grown example of *Rosa canina* var. *fraxinoides*. Moreover, it harboured a huge colony of *Nepticula anomalella*, more usually encountered as a garden pest in England and rarely found anywhere in Scotland so far as my knowledge goes. Again, it seems marvellous how the insect maintains itself on an isolated shrub in such an exposed situation.—J. W. HESLOP HARRISON, Isle of Rhum.

CURRENT NOTES.

SOUTH-EASTERN UNION OF SCIENTIFIC SOCIETIES.—In view of the present circumstances it has been decided to postpone the Annual Congress until the Autumn. The new date is Saturday, 14th October, when the Congress will be held at the Royal Grammar School, High Wycombe, under the Presidency of Prof. Lancelot Hogben, F.R.S. The Congress Bulletin will be circulated as soon as arrangements have been completed.

It would be interesting to hear from our readers what they have to say about the effect that this most abnormal season has had upon the insect life of the countryside. Three weeks spent in the very heart of a well-wooded mid-Surrey area have afforded not more than 3 species of butterflies and scarcely a moth could be stirred from the hedgerows and sheltered banks. Nor did the abundant growth of foliage show traces of larval depredation.

undatus. Alae anticae canae fusco nigro subfulvoque nebulosae. Stigmata ordinaria magna alba, at in medio plus minusve cinerea. Juxta marginem posticum striga multidentata nigra ordineque punctorum fuscum marginali." Haw.

It is the *grandis*, Donovan, and the *plebeja*, Hb., 78, "The Grey Arches."

ssp. *nimbosa*, Gn., *Hist. Nat.*, II, 77 (1852).

ORIG. DESCRIP.—"Very near *nebulosa* but it has a different look: the wings are more rounded, the abdomen shorter, the thorax more thickly covered, with stronger patagia, the collar straighter. The forewings are of ashy-white slightly yellowish, covered with black atoms, but less numerous, above all on the costa, and the markings are of a more decided black. The orbicular is quite round and more distinctly circled with black. The fringe is noticeably longer, more perfect. The hindwings are more obscure, with fringes of a pure white; the median line and the lunule are stronger and below this line also thicker, is appreciably nearer the cellular lunule, which is larger. The pterygodes are bordered exteriorly with black; but the interior border if it exists does not form a pronounced projection behind the collar as in *nebulosa*." N. America.

race *askolda*, Obthr., *Et. Ent.*, V, 79 (1890).

ORIG. DESCRIP.—"Only differs from the ordinary French type by its tint being of a little more slaty-grey, consequently much duller in colour." Isle of Askold ["violet suffused all over"—see below, *Iris*, X, 334.]

Hamp., *Cat. Lep. Ph.*, V, 114 (1905): "Rather browner; a large form." E. Siberia, Japan.

race *lama*, Stdgr., *Iris*, IX, 254 (1896).

ORIG. DESCRIP.—"Only one fresh, small ♂ 44 mm. in expanse, of all my *nebulosa* this gives a really different aspect. It somewhat resembles the var. *askolda*, Obthr., but is much smaller and lighter; the forewings are smutty ash-grey, the markings stand out far less, the outer transverse line (elbowed) is obsolescent. The black wisp spot at the lower tooth of the lighter transverse line before the outer margin stands out particularly distinct (sharp), the hindwings and the underside of all the wings are lighter than in *nebulosa* and r. *askolda*; on the dark grey underside of the forewing a part of the veining stands out sharply darker, but a lighter outermarginal part is not noticeable, as it is in single specimens of v. *askolda*." Illiassutai. (Changai.)

race *asiatica*, Stdgr., *Iris*, X, 334 (1897).

ORIG. DESCRIP.—"A perfect pair, is somewhat darker than European examples, and agree therein with those from Central Asia, Altai, and the Amur. I thought at first that it must be placed with the var. *askolda*, Obthr. (also darker), from the Amur, but the typical var. *askolda* have darker forewings, which are violet-suffused all over. This is not the case in my dark Asiatic *nebulosa*."

Hamp., *Cat. Lep. Ph.*, V, 114 (1905): "Forewing dull grey, size somewhat smaller." C. Asia.

ab. *thompsoni*, Arkle, *E.M.M.*, XL, 180 (1904).

ORIG. DESCRIP.—“ The upper wings are black. There is an indistinct, and slightly blacker median fascia or transverse band. The upper and widest part of this band embraces the discoidal cell in which the discoidal spots (orbicular and reniform) appear faintly as smoky-black markings, paler than the rest of the wing area. The outer margins are white, and include, in addition to the cilia, the areas of black crescentic spots which appear in the typical form of the insect from Delamere Forest. These white margins are consequently scalloped interiorly. The costal margins have three white spots near the apical angle.

“ The lower wings are smoky-black. The abdomen smoky-black with darker dorsal crests, and darker posteriorly. The anal tuft is white. The anterior and lateral crests of the thorax are black pointed behind and well developed. The latter have long, broad, interior white patches.

“ The front legs are black, the hind legs smoky-black with white spots.”

The above description, with the references to “ white ” characters would do well for *f. robsoni*. The *ab. thompsoni* would appear to be an extreme of *robsoni* in which the black is intensely so and with the lighter portions still lighter to real white which is intensely so in the outer margins of the wings where it engulfs the crescentic marginal spots which give it a “ scalloped ” appearance; Dr Cockayne does not agree with this but says that it is the “ homozygote ” and *robsoni* is the “ heterozygote.”

ab. conspicua, Warr.-Stz., *Pal. Noct.*, III, 78 (1909).

FIG.—*l.c.*, plt. 19e.

ORIG. DESCRIP.—“ A pale brownish-grey form, in which the submarginal line is conspicuously black and continuous throughout, even more prominently than in the *ab. calabrica*: the underside with the extreme outer margin and fringe prominently pale ochreous.”

ab. calabrica, Warr.-Stz., *Pal. Noct.*, III, 78 (1909).

FIG.—*l.c.*, plt. 19e.

ORIG. DESCRIP.—“ A very large form; the forewing with pale blue-grey ground colour, irrorated and suffused with dark grey in basal half (in one example all over the forewing), with all the lines and stigmata strongly expressed in black and pale grey, the submarginal line in particular being continuous, black and dentate, the hindwing is likewise much darker, with all the veins, the cell-spot and under line well marked.” Sila Mts. near Botte Donata, Calabria.

var. *plumbosa*, Mans., *Ent.*, I, 49 (1917).

ORIG. DESCRIP.—“ Forewings leaden-grey to fuscous-grey; stigmata faintly outlined with white and exteriorly with black; transverse lines faintly white, posteriorly black, interrupted; a transverse series of small black acute tooth-shaped marks representing the subterminal lines; on the termen a series of black lunules and dots; the veins in the subterminal region black; hindwings in both sexes uniformly dark grey, the veins darker than the ground colour. Head, thorax, patagia and abdomen as in var. *bimaculosa*, but slightly darker.” Liverpool area.

Aplecta, Gn. (1841) (1852), Dup., Sth., Warr.-Stz., Drdt.-Stz. [*Polia*, Ochs. & Tr. (1816-25), Hamps.: *Melanchra*, Hb. (1820), Meyr., Meyr.: *Mamestra*, Hb. (1821), Stdgr., Splr., Sth., Culot] *tincta*, Brahm (1791).

Tutt, *Brit. Noct.*, III, 69 (1892): Meyr., *Handb.*, 86 (1895): Barr., *Lep. Br. Is.*, IV, 158, plt. 154, 2 (1897): Stdgr., *Cat.*, IIIed., 155 (1901): Splr., *Schm. Eur.*, 1, 169, plt. 36, 11 (1905): Hamp., *Lep. Phal.*, V, 111 (1905): South, *M.B.I.*, I, 237, plt. 117, 1 (1907): Warr.-Stz., *Pal. Noct.*, III, 78, plt. 19c (1909): Culot, *N. et G.*, I (1), 98, plt. 16, 14 (1911): Meyr., *Rev. Handb.*, 157 (1928).

Ernst & Engram., *Pap. d'Eur.*, VII, 86, f. 467a, b, c (1790), gave good figures. Both figures have a dark band passing between the stigmata. They express the strong opinion that the characteristics do not conform with those of *hepatica*.

Esp., *Abbild. Noct.*, IV, 2 (1), 400, plt. 131, 5 (1789+1?), gave a figure under the name *trimaculosa*, which is generally attributed to *tincta* although much too dark for the "Silver Arches," and scarcely recognizable as such. Werneb. confirms the identification, *l.c.*, II, 43.

de Villers, *Linn. Ent.*, II, 649 (1789), described it under the name *occulta*.

Bork., *Naturg. Noct.*, IV, 543 (1792), described *tincta* from the only example (from Brahm) he had seen, but gave a single reference only, *Scriba, Beitrage*, III, plt. xviii, f. 2.

Hb., *Samml. Noct.*, 77 (1800-3), described this species under the name *hepatica* in error, as in his *Text* he corrected it to *tincta*. His figure was an excellent one of the species.

Laspeyres, in *Illig. Mag.*, II, 109 (1803), in an article which dealt at length with the new and revised edition of the *Wien Verz.* by Illiger (1801), discussed the identification of *hepatica* and its relation with the *hepatica* in Clerck's *Icones*. He said that Hübner's *hepatica* (*tincta*, Brahm) did not belong to the same group as the *hepatica* of the *Verz.* of Schiff. He referred to the figure and description in *Scriba. Beitr.*, III, 255, plt. xviii, 2 (1793). This fig. is large but quite recognizable as *tincta* without a doubt. The description is by Brahm.

[The *tincta* controversy is rendered more intricate by the pseudo-recognition of the *Icones* of Clerck (1759 ?). This work was not "published," and therefore dependence on it is invalid. It was written for the Swedish royal house and only a few copies are known to exist. It consists of a series of plates of coloured figures many bad and difficult of identification.]

Haw., *Lep. Brit.*, 186 (1809), described this species under the name *argentina*, the "Silvery Arches," and said it was *hepatica*, Hb. 77. Werneb., *Beitr.*, I, 213, stated his view that *hepatica*, L. (*Fn. S.* and *Sys. Nat.*), was the form *hepatica*, Clerck, *Icones*, which was the *tincta*, Tr. (See *Stett. e. Ztz.*, 1858, p. 290, "Notes on the rare Clerck's *Icones*," by Werneburg.)

Treit., *Schm. Noct.*, V (2), 43 (1825), gave references to authors, who identified *tincta* with *advena*, *occulta*, *hepatica*, *characteria* and *trimaculosa* mainly in error. He discussed at length the question whether *hepatica*, of Linn., *Sys. Nat.*, ditto of *Fn. Suec.*, and of Clerck, *Icones*,

plt. 8, f. 5, are to be identified with *tincta*, and he submitted a letter of Ochseneimer's giving his opinion. He, Ochs., pointed out that the words "alis glaucescentibus" referred undoubtedly to *tincta* and not to *hepatica* (true). Later Hb., in his *Text*, p. 190, corrected *hepatica* to *tincta*.

Dup., *Hist. Nat.*, VI, 389, plt. 96, 3 (1826), gave a figure much too formal and stiff in marking on both fore and hindwings. The reniform and claviform are of a brilliant red. The transverse lines are too definite especially on the hindwings, where they are difficult to trace in both British and Continental examples.

Frr., *Neu. Beitr.*, IV, plt. 293 (1842), gave a very fair fig. of *tincta*, and discussed the errors of identification made by previous authors. He had given in his *Beitr.*, plts. x and xxviii, all stages of both *occulta* and *advena*, from which *tincta* was characterized by its clear silvery green and purplish-red shades. He went on to say that he was convinced that the fig. in Clerck (*Icones*, VIII, 3) labelled *hepatica* was none other than *tincta*, and that the *hepatica*, L., was distinct from *tincta* and could be more readily united to *rurea*. He found that the obscurity of the connection of *tincta* and *hepatica* was now cleared.

Gn., *Hist. Nat.*, VI, 81 (1852), remarked on the figure *hepatica*, Clerck, showed the red and blue in such a way that it affords great resemblance with our *tincta* with the result that errors have arisen in identification as in the case of Hb.

Barrett, *l.c.*, on plate 154 figured five specimens. Fig. 2b is a small Scotch bluish-grey form. Figs. 2c and 2d from Staffordshire should have blackish-purple markings, but the former has no markings of that colour.

Stdgr., *Cat.*, IIIed., 155 (1901), treated *hepatica*, Hb., as a synonym, and only recognized one form, his own ab. *obscurata*.

Hamp., *Lep. Ph.*, V, 111 (1905), gave only one f. *obscurata*, Stdgr. "Smaller and darker."

Splr., *Schm. Eur.*, I, 169, plt. 36, f. 11 (1905), gave a good figure and dealt with *hepatica*, *suffusa* and *obscurata*.

South, *M.B.I.*, I, 237, plt. 117, 5 (1907), gave a very good figure of the average British form.

Warr-Stz., *Pal. Noct.*, III, 78, plt. 19c (1909), gave three very good figures, ♂ and ♀ typical showing the blue areas clearly, and ab. *hepatica*, Hb., with the slight brown suffusion darker. They treated *trimaculosa*, Esp., and *argentina*, Haw., as synonyms, and dealt with *obscurata*, Stdgr., from the Amur, ab. *hepatica*, Hb., and *suffusa*, Tutt, with a purple-brown median area.

Culot, *N. et G.*, I (1), 98, plt. 16, f. 14 (1911), gave an excellent figure of a somewhat dark form.

Variation as stated by Barrett:—"Usually not variable except in a small degree in the extent of purple-brown clouding, which in some instances extends itself broadly over the forewings, in others is restricted to only a portion of the central space; but there is also some local variation, specimens from Scotland having the ground colour of the forewings more tinged with grey or bluish and the markings more purplish; while in North Staffordshire this tendency appears to be intensified, specimens forwarded from that district being decidedly bluish, with almost blackish-purple clouding. Examples from Scotland appear to be usually smaller."

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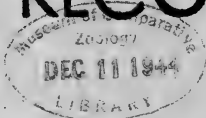
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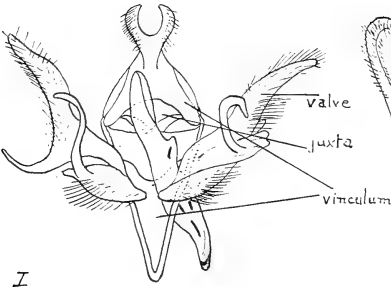
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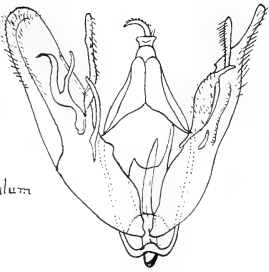
PLEASE NOTE THESE DATES. IMPORTANT NEWS.

On TUESDAY, December 5th, and WEDNESDAY, 6th, the FOURTH PORTION of the Collection of BRITISH LEPIDOPTERA formed by the late Sir BECKWITH WHITEHOUSE, will be sold by Auction, at Messrs GLENDINING & CO., LTD., 7 Argyll Street, London, W.1, at 1 p.m. precisely. ON VIEW ALL DAY; MONDAY, 4th December. Further particulars from:

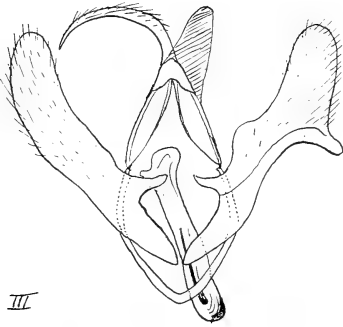
L. HUGH NEWMAN, F.R.E.S., "The Butterfly Farm," Bexley, Kent.



I



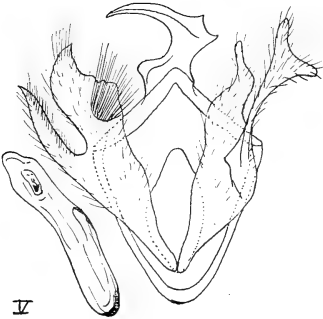
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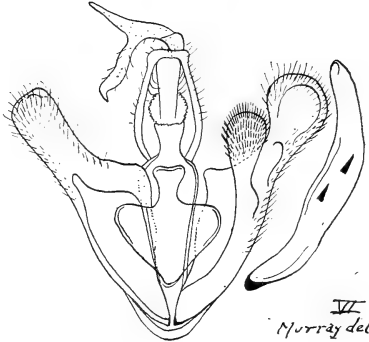
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V



VI

Murray del.



ASYMMETRY.

By REV. DESMOND MURRAY.

(Plate III.)

The duplicate parts of the internal organs of Lepidoptera are remarkably constant in the greater majority, but in comparatively rare cases there is a want of symmetry, i.e., the organs are not alike on two sides.

The late Mr F. N. Pierce found that such various parts of the genital organs as the valves, the juxta and the vinculum were occasionally so affected, especially in the case of the valves and their armature. He has shown conclusively by his life's work, on the interesting comparison of the genitalia, that species can be differentiated by these organs where other means fail.

Wing markings, colour, size, and similar external factors are often affected by environment and show considerable variation, but this does not apply to the internal organs, which remain unchanged. For this reason the examination of the genitalia is considered by many to be the best means of distinguishing and separating one species from another; the study of all the characters in combination, nevertheless, is necessary.

The seven volumes, which Pierce has left us, cover the genitalia of practically all our native species, of Lepidoptera, and must remain the key, as well as the source of additional knowledge, reaching into the vast field of the same and other families of Lepidoptera throughout the world.

"The study of the whole order of Lepidoptera has convinced me," Pierce says, "that the genitalia throughout the order have been developed on the lines of a common plan, which has been so far modified as to suit the requirements of each individual group. Some of the parts may be atrophied or even absent, others decorated with elaborate armature, others much displaced, others now free, now fused together, but the main features remain common to all the groups." (*Introd. Gen. Geomet.*)

The subject of asymmetry is the only one point considered in this short paper.

Want of symmetry appears to affect particular genera and even groups, the examples being found to be constant, not just chance abortions. In one place (*Gen. Geomet.*, 1914, p. 12) Pierce says:—"Asymmetry in species seems to denote transitional forms," a remark that gives promise of a fruitful line of investigation. The proportion affected is certainly small, perhaps 2 to 3 per cent. at the most. Asymmetry cannot be correctly called an abnormal form—it is rather an irregularity, a form of variation or mutation since it occurs constantly in certain species. What, then, is the explanation of it and why does it occur? The suggestion made by Pierce is, as far as the writer knows, the only one given so far by any writer. In fact, the question does not seem to have been discussed.

According to Meyrick's laws:—

- (1) No new organ can be produced except as a modification of some previously existing structure.

- (2) A lost organ cannot be regained.
- (3) A rudimentary organ is rarely re-developed.

How then are such irregular forms as these affected? If they are in a transitional stage they must either be the remains or relics of some lost organ, or the modification of an existing one, yet in neither case does the cause for such an irregularity seem to be explained.

They occur constantly in the particular case, in the same way as the normal and symmetrical form occurs. If one reverts to the time factor, there is at present no evidence to show when and how they were modified. The above laws, then, do not explain their occurrence.

Chitin, of which these organs are made, is a hard substance that defeats almost every known method of section cutting. It is softened to some extent by long immersion in spirit soap but is not destroyed, even when of slight density, when soaked in caustic potash for 24 hours. How, then, can these organs be affected by environmental conditions? As easily expect the shape of animals' bones to be changed by the elements as to conclude that these organs be affected by environment.

Amongst our own Noctuae, *Miselia oxyacanthae* (Green Brindled Crescent) is certainly a most remarkable form (Fig. I), "difficult to understand," Pierce remarks. Many of the *Pterophoridae* also show constant asymmetry—*monodactyla* (A common Plume) is a good example (Fig. II).

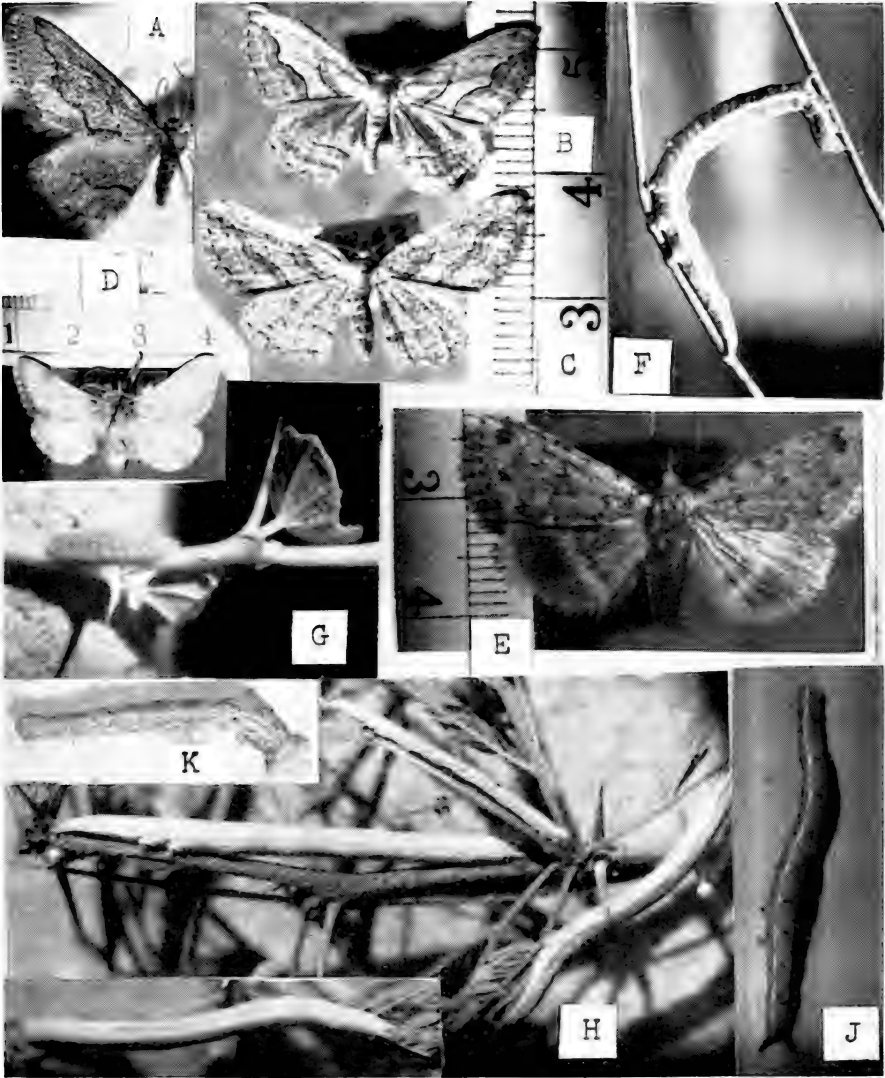
In the first case the left valve is long and narrow, without corona, the clasper angulated at the base; the right valve is similar, but above the sacculus it throws out a long curved arm. In the female the ductus-bursa is complicated.

In *monodactyla* the right valve is pointed, the left rounded, the apex heavily spined. The right sacculus is atrophied. From the costa is a short spined arm, with a hooked point at the base. The left valve is double, the inner arm slender, the outer arm sigmoid. From the costa there extends a long spined arm, with a hooked point at the base. The anellus is also asymmetrical. The female organ has an unusual character, the ostium leads directly in to the bursa. These descriptions are given by Pierce.

While studying recently some moths from S. America, a few were found to show remarkable asymmetrical forms, some of which are given here. [The correct naming of the insects has been verified by the authorities of the British Museum, to whom acknowledgment is gratefully made for help given.]

The figures have been made a uniform size, but vary somewhat in size according to the expanse of the insect. They were drawn from mounts made by the author with the aid of the camera lucida to about 75 times natural size, then reduced in reproduction to less than half that size, i.e., to approximately $\times 30$. Birch collected in N.E. Brazil, 1907-12. Foster at Sapucay, Paraguay, 1902-04.

Euglyphia hieroglyphica, Cram. Fig. III. Exp. 20 mm.—Forewing dull yellow with a double row of small black spots on subterminal line, a thin curved bar on post-medial line, a black orbicular spot. Hind-wing a uniform dull brown to black. Left valve normal, right valve developed into a large angulated blunt point about middle. N.E. Brazil, F. Birch, 1908.



Agrotidae sp. Fig. IV. Exp. 20 mm.—Forewing and hindwing a uniform warm brown; antennae clefted. Left valve divided into three distinct narrow arms, the outer arm heavily spined. Right valve broad, the two outer arms blunt, inner arm narrow, pointed. Sapucay, Paraguay W. Foster, 1902.

Safia permixta, Schaus. Fig. V. Exp. 20 mm.—Forewing dark brown, with silvery markings and dark cross stripes. Hindwing centre dark brown, termen to apex lighter in colour. Foreleg heavily scaled, having the appearance of a scent brush. Valves quite different in structure. Left valve divided into a broad (inner) arm, heavily spined, outer arm narrower. Right valve also divided into two arms, inner with some semblance to left but smaller and not spined, outer developed into a double-headed longer arm. Uncus, strongly chitinized into a very large hatchet-shaped head. N.E. Brazil, F. Birch, 1909.

Lole exhausta, Guen. Fig. VI. Exp. 24 mm.—Forewing greyish white, costa with three light brown patches at equal distance apart, between thorax and apex. Hindwing greyish white, medial line light brown and some spots. Foreleg holds a very large brush of long setae, which dissection shows to be a scent brush. Left valve normal shape, the clasper is large. Right valve larger and longer, developed into a roundish apex; ampulla a large round spinose knob. Uncus very large, mandibulate. Sapucay, Paraguay, W. Foster, 1902.

EXPLANATION OF PLATE.

Male Genitalia of:

- Fig. I.—*Miselia oxyacanthae*, Europe.
 Fig. II.—*Emmelina monodactyla*, Europe.
 Fig. III.—*Euglyphia hieroglyphica*, Cram., Brazil.
 Fig. IV.—*Agrotidae* sp., Paraguay.
 Fig. V.—*Safia permixta*, Schaus., Brazil.
 Fig. VI.—*Lole exhausta*, Guen., Paraguay.
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EARLY STAGES OF ORIENTAL PALAEARCTIC LEPIDOPTERA. VII.

By E. P. WILTSHIRE, F.R.E.S.

(Plate IV.)

(The two preceding articles in this series were "Early Stages, etc. V." and "Some more new Lepidoptera from S.W. Iran, with their life histories," which was equivalent to the sixth; they appeared in *Journ. Bombay N.H. Soc.*, Vols. xliii, xlv, April and December 1943, respectively.)

RHOPALOCERA, LYCAENIDAE.

Tarucus balcanicus, Freyer, ssp. *areshanus*, B.-Baker (Fig. G.).

Larva:—Full-grown: 10 mm., wood-louse-like, bright green, just matching the underside of the fresh nebek leaf. A creamy white dorsal line begins on the posterior half of the enlarged first somite; here it is broadest and has a red-brown centre; this reddish colour is only to be

seen on somites 1-3. The dorsal line is interrupted at each somite by a pale green wrinkle. Head, hidden under somite 1. Sublateral line, just above "lappets," wavy and faint whitish-green. Hairs downy, short, white.

Pupation:—On 16th October the larva ceased feeding, and was found on the lid of the tin, turning purple on somite 1. On the 19th it took up a new position in the bottom corner of the tin; it was now transparent, dusky grey-green, with pale lines still visible. It pupated on the evening of the 19th October. A male butterfly emerged from this pupa on 27th October.

Pupa:—At first green, with purple-red dorsal line. On 20th October it had turned black and brown.

Foodplant:—*Zizyphus spina-christi* ("nebek") at Basra. In the Kurdish mountains and in the Anti-Lebanon the butterfly is associated with *Paliurus spina-christi*, *Zizyphus* being absent. The larva eats "windows" on the underside of the "nebek" leaf. The above larva was found surrounded by small ants on its foodplant; it was then full-grown but still feeding. The butterfly is continuously-brooded.

HETEROCERA, AGROTIDAE, QUADRIFIDAE.

Hypoglaucitis benenotata, Warr. (Figs. F., J.).

This genus is placed just before *Clytie*, and the larva shows great likeness to *Clytie* larvae both in structure and foodplant (*Tamarix*). I have already published an account of the early stages of several kinds of *Clytie*, as follows:—

sancta, Stgr., *Ent. Rec.*, July-August 1935.

syriaca, Bugn., *delunaris*, Stgr., and *terrulenta*, Christ., all in Mitt.

Muench. *Ent. Ges.*, 1939, Heft 1.

distincta, B.-H., ssp. *iranica*, Brandt, in "Early Stages . . . V." mentioned above.

All these larvae differ from the *Hypoglaucitis* in one respect: *benenotata* retains its green colouring even in the last instar, whereas they turn brown in the penultimate or an earlier. This change is accompanied by a change in habit, the green forms resting among the green "needles," the brown forms resting on the twigs or branches or trunk.

The larva of *benenotata* is a good example of a coloration-type illustrated in my 1939 article mentioned above, and which is especially found in larvae attached to tamarisks and conifers. These larvae are taxonomically unrelated to each other, and the foodplants are also taxonomically distant from one another; the only apparent common feature in the foodplants are their similar appearance, green needles replacing broad, flat leaves. This would seem to be a case of what has been called "visual adaptation," in which neither chemistry nor heredity play a perceptible part.

Full-grown larva:—Green, long, tapering, with first pair of claspers rudimentary (see plate), with white longitudinal markings not unlike those of the penultimate instar of *delunaria*. The differences are: (a) The white spiracular lines are uninterrupted; (b) the purer white subdorsal line is almost or quite uninterrupted; (c) there are no traces of a double white dorsal line at all; (d) somites 8-11 bear a slight ochreous-brown discoloration, which in some forms extends so as to

suffuse the whole dorsal area with gold-brown, except at somital joints, which remain green; this "brown form" (Fig. J.), however, is not brown elsewhere, being green laterally and ventrally; in it the fine lateral line has a clearer dark almost blackish wavy double edging and is only white near the head. In the more normal green form this fine lateral line is white throughout; there is also some very faint white longitudinal pencilling in the green ground colour laterally. Somite 8 is slightly swollen dorsally. Spiracles yellow, black-rimmed, set on the top edge of the spiracular line. In the green form there is a slight tendency to ochreous in the somital joints except on somites 8-11. Under-side countershaded, paler milky green. Head green, with white longitudinal continuations of the body lines.

Foodplant:—Tamarisk (*T. articulatus*).

Localities and date:—Zubeir and Basra, S. Iraq, 1943. Imagines were bred or caught from early April to late June, and again in Norember; one example was taken at Ahwaz, Khuzistan, S.W. Persia, on 2nd October 1938. There seems little doubt that this moth is continuously-brooded, possibly with a retardation in midsummer. It does not appear to penetrate Central and Northern Iraq and Iran. The same can be said of the foodplant recorded above, which is planted in oases widely over Arabia.

Thermesia arefacta, Swinh. (Fig. H.).

Ovum:—Bun-shaped, brown, with faint concentric circles of fine white dots, only visible under a lens; laid singly; period (in April at Basra), 6-7 days.

Larva:—When freshly hatched, thread-like, active, dark-brown. In the second and third instars, dark brown with paler longitudinal stripes; many have a well-marked double dusky ventral line. Full-grown: tapering, slender, with only three pairs of claspers (see plate); sandy-ochreous, the somital joints infused with a warmer rust colour. Dorsal line double, pale. Longitudinal lines pale yellowish. Subdorsal is pale, single, fainter than the dorsal. A greyish mottled subdorsal area contains two dark grey wavy lines. There are many faint slightly wavy lateral lines, ochreous above but darker grey just above the spiracles. Spiracular stripe pale. Spiracles black-rimmed. Sublateral and ventral area counter-shaded, paler, with very faint fine wavy lines. Head ochreous grey, with paler lines and a darker inverted V-mark. Legs and claspers of ground colour, but claspers sometimes marked laterally with black. On posterior part of somite 4, two subdorsal stigmata, marked in black, sometimes conspicuous.

Pupa:—Glossy, light red-brown, in slight cocoon among leaves or low herbage.

Foodplant:—*Prosopis stephaniana*; in Basra the larvae also fed up readily on the imported ornamental tree *Acacia farnesiana* but none of these pupated successfully. The pupal period observed at Bagdad in September was 9 days, and the moths emerged in the evening. The moth flies by day; also at dusk; is sometimes to be found at night settled on its foodplant. Appears to be an oasis moth, haunting irrigated ground and rank riverside vegetation.

GEOMETRIDAE.

Boarmia tenuisaria, Stgr. (Fig. K.).

Larva:—Grey or greenish grey, paler below; fairly stout; somites 4, 8, 9, and 11 each have a pair of dorsal warts on the anterior half, the pair on 9 being smaller than the others. Dorsal chain rather as in the genus *Catocala*, i.e., composed of two paler outer strands which unite or form islands in their course down the back. Subdorsal lines fine, double, grey, suffused with reddish-brown, the grey deepening to black in the vicinity of the paired warts. Spiracles small, grey, black-rimmed. Underside: ventral line, blackish between the claspers; on somites 4-8 a broad whitish grey-edged stripe, with outer edges more parallel than those of the dorsal chain, and marked with black stigmata near the somital joints; this stripe contains a grey-edged ventral stripe which widens and narrows slightly in its course. Size, full-grown, 1 inch. The larva buries to pupate.

Pupation takes place in early April in the Basra district, and the moth flies there throughout November. The male comes to light in the vicinity of the foodplant, *Lycium barbarum*. It seems to be an oasis moth. The foodplant is leafless in summer and autumn and comes out in leaf about January-February.

KEY TO PLATE.

One plate illustrates the two articles, "Middle East Lepidoptera: New forms and species, VI," and "Early stages of Oriental Palaearctic Lepidoptera, VII."

N.B.—The enlargement of the insects is not uniform; the printed scale shown is metric, the figures representing centimetres.

Figs. A.-E. illustrate "Middle East Lepidoptera: New forms and species, VI."

Fig. A. *Boarmia ghirshmani*, sp. n.

B. *Boarmia tenuisaria*, Stgr., ♂.

C. *Boarmia tenuisaria*, Stgr., ♀, ne-allo-TYPE.

D. *Chondrostega subfasciata brunneicornis*, subsp. n.

E. *Autophila cymaenotaenia* ssp. *orthotaenia*, subsp. n.

Figs. F.-K. illustrate "Early stages of Oriental Palaearctic Lepidoptera, VII."

Fig. F. Green form, larva, *Hypoglaucitis benenotata*, Warr.

G. Larva, *Tarucus balkanicus* ssp. *areshanus*, B.-Baker.

H. Larvae, *Thermesia arefacta*, Swinh.

J. Brown-marked form, larva, *Hypoglaucitis benenotata*, Warr.

K. Larva, *Boarmia tenuisaria*, Stgr.

PSODOS CORACINA.

DISCOVERY AND DESCRIPTION OF FULL-GROWN LARVA.

On 29th April 1943, while searching for pupae or larvae of *P. alpina* about 2500 feet up on a mountain at Aviemore, my wife and I turned up three geometrid larvae. From their similarity to the larva of *G. obscurata* I suspected them to be those of *P. coracina*. I sent a rough description to Dr Cockayne, who confirmed my suspicion and told me

that the full-grown larva was not known, the only description published being taken from an immature alpine specimen in 1910, before its first hibernation. Accordingly, I immediately blew one of the two remaining larvae, as one had already gone down, and showed the other to Mr T. Bainbrigge-Fletcher, who very kindly helped me with the following description:—

LARVA OF PSODOS CORACINA, ESPER.

Length about 11-12 mm. (10 mm. in contracted, curled-up position), cylindrical, stout (2-5 mm. vertically): segments distinct, each subdivided into two or three pale lilac-grey: head very dark ferruginous-brown, its top dull ferruginous-brown on either side of mid-line, this colour extended over dorsal area of prothorax and mesothorax, and bordered by a dull grey-whitish subdorsal line which extends all along the body: on the abdominal segments this subdorsal line is bounded and more or less cut by a dark fuscous streak which runs diagonally downwards and backwards and forms (when seen from above) a pair of dark backwards-directed V-shaped markings, preceded by pale violet-grey ground-colour and enclosing a darker dorsal patch; each of these diagonal markings commences behind the fore-border of the segment and is continued on to the succeeding segment; on the fifth and succeeding abdominal segments the diagonal markings are less evident and form a chain-pattern dorsal marking: about mid-way up each segment (seen laterally) is an upright-elongate dull-orange marking on the extreme fore-margin of each segment: the subdorsal oblique dark markings are more or less repeated just below the spiracles, forming an interrupted waved dark line, immediately below which there is a well-developed flange of the skin accentuated by its whitish colour: ventral area (i.e., all below the flange) dull greyish with a slight ferruginous tinge, the anterior edges of the segments marked darker. In general shape and appearance this larva is much like that of *Psodos bentelii* as figured by Dr E. Wehrli and H. Imhoff in *Mitteilungen der Schweiz. Ent. Ges.*, vol. xiii, heft 5, tab. 10, figs. 1, 2.

This larva I blew later as it seemed on the point of death, and I was disappointed when the first only produced a parasite. The larvae were discovered among Crowberry (*Empetrum nigrum*), on which they subsequently fed, or on the ground under it, though they may have been dislodged from the food-plant above. They were very sluggish and, in fact, we were beginning to wonder whether they were alive when suddenly one began looping up my wife's hand. In April 1944 we found three more larvae, which was odd, as the moth is supposed to be of rare occurrence in the even years. Two of these produced ♀ imagines on 1st and 2nd June and the third one died.—AUSTIN RICHARDSON, Beaudesert Park, Minchinhampton, Glos.

NOTES ON THE LIFE HISTORY OF PSODOS CORACINA, ESP.

By E. A. COCKAYNE, D.M., F.R.C.P.

In spite of the abundance of the moth little is known about its early stages, and I do not think it has ever been bred from the egg. Barrett says that larvae have been found pupating, presumably in early June,

by collectors searching for pupae of *Amathes alpicola*, but I have been unable to find a description of their appearance. So far as I know the first discovery of wild larvae still feeding was made by Mr Austin Richardson, who found four at Aviemore on 29th April 1943 lying motionless on the surface of the peat under lichen, above which crowberry was growing. They were almost full-grown and pupated within a week. He found another full-fed larva at about the same date in 1944. As long ago as 1906 I said that crowberry seemed to be the most likely food-plant, because so many moths, especially females, could be disturbed from tufts of this plant (*Entomol.*, 1906, **39**, 53).

In 1944 Mr R. C. R. Crewdson kindly sent me a large number of eggs from Rannoch and these began to hatch on 19th July. The newly hatched larvae were cylindrical and blackish in colour with very short setae arising from minute black tubercles. They started to feed at once on crowberry and also ate knotgrass sparingly, but refused it altogether in their third instar. When ready for their first ecdysis they were smoky blackish-brown and semitransparent. In the second instar the whole larva is still blackish-brown, including the head, and the setae are even shorter in proportion to its bulk. When ready for the second ecdysis it is sausage shaped, dull reddish-brown, and semitransparent. At this stage, having only two plants of crowberry, I chose sixteen of the largest larvae and put them into the hot cupboard, placing the rest on a growing plant in the garden. In the third instar traces of the adult pattern appear, and they resemble in colour the figure of *Psodos noricana*, given by May and Fleischmann (*Jahresbericht Wien Ent. Verein*, 1899, 10, Taf. I), but the markings are less distinct. In the fourth instar these become much more distinct and the head is blackish-brown, but not so dark as in the earlier stages. Indeed, but for the colour of the head, it is very like a miniature adult larva.

Early in September the largest larva changed skin for the fourth and last time and was soon followed by fourteen others, but the sixteenth was about an instar behind. On 15th September the large larvae were 11 to 12 mm. long, and the smallest one, which was changing skin, was 9.5 mm. long. During the rest of September they still fed freely, but, when they were about 15 mm. long and appeared to be nearly full-grown, they fed less and less and only traces of fresh food were found in those I blew. On 22nd November there were very few young shoots left and I had to put the remaining larvae onto a growing plant in the garden.

All through their lives the larvae were very sluggish, and at no time made use of silk threads. In the last instar most of them lay on the bottom of the tin all day and even at night I seldom saw them feeding or moving spontaneously, but if a larva was exposed to the light it soon became restless and slowly moved about until it found shelter. They much preferred the young leaves of the crowberry to the older ones, cutting off as many as they ate and wasting them. On one occasion I gave them a piece of heather and a sprig of bilberry, but they left both untasted.

The following is a description of the larvae in their fifth instar. Head rounded, varying in colour from a bright pale red-brown to a darker shade of the same colour with an indistinct paler line running vertically down each epicranial plate, surface matt. There are various forms, but the pattern is very similar in all. There is a thin dark dorsal line

broken at each intersegmental junction and bordered with white; external to this there is a broad longitudinal band on the thoracic somites, and a series of chevrons with the apices pointing forwards on the first five abdominal somites, each chevron formed by the dorsal line and an oval mark on each side of it, continued as a triangular mark running obliquely backwards and outwards to a point just above the spiracle of the following somite. On the 6th, 7th, 8th, and 9th abdominal somites there is a continuous longitudinal band becoming wider at the middle of each somite and narrower at each intersegmental junction, the band itself becoming narrower on each successive somite. It is dark and well defined externally but becomes paler internally and fuses with dorsal line; on the 9th abdominal it becomes very narrow and then rapidly widens into a triangle with its base towards the anal end of the larva, the dark mark on the 10th being almost hidden by the overlapping prominence formed by the preceding somite. The whole of this dark area has a clear white line external to its border. There is a broad supraspiracular band on the thoracic and abdominal somites, but on the last two it is broader anteriorly than posteriorly; its upper and inner edge touches the backward pointing tips of the chevrons; below it there is a broken white line which is obscured on the thorax by dark shading. Below this there is a broad spiracular band on the thorax, but on each abdominal somite this is broken into two parts, one in front of the spiracle and the other behind it; the former has dark edges filled in more or less completely with dark speckles, but the latter is completely dark and runs obliquely downwards and backwards to end below the very small black spiracle. The two parts are separated by an oblique white line, in which the spiracle lies, and each part touches the supraspiracular band at one point. On the three last abdominal somites the band is continuous though darker behind the spiracle. Below the spiracular band there is a clear white stripe, and below this the remainder of the lateral and the whole of the ventral surface is dark coloured, but by their still darker colour a broad subspiracular band, two narrower subventral stripes and a median ventral stripe can be distinguished, while in the palest there is a whitish line between the subspiracular and the rest of the ventral surface. The larva in its last instar is short and stout, broadest at the 5th abdominal and tapering gradually towards the anterior and more quickly towards the anal end. It is much wrinkled owing to the deep infolding of the skin at the subsegmental and intersegmental divisions.

The following three colour forms occurred amongst my sixteen larvae, but there were various gradations between them.

(1) Head, prothoracic plate, and all the markings on the dorsal surface except the tips and outer edge of the chevrons, which are nearly black, pale bright reddish brown; the supraspiracular band dark reddish-brown on the thorax and light red on the abdominal somites, becoming very pale on the anal plate; the spiracular band edged above with dark purple above and below with the anterior part in front of the spiracle a mixture of red-brown and purple and the posterior part dark; the ventral area and the prolegs darker red-brown.

(2) Head medium reddish-brown, prothoracic plate dark red-brown with a purplish tinge, and all the dorsal markings deep purple; the supraspiracular band purple on the thorax and a mixture of purple and

red-brown on the abdominal somites; the spiracular band light purple on the anterior and dark purple on the posterior part of each somite; the ventral surface and prolegs very dark purple; in some cases the anterior pair of prolegs are reddish-brown with a purple tinge.

(3) Head medium red-brown; prothoracic plate and thoracic markings red-brown with darker brown dorsal line and outer border to the subdorsal band; on the abdomen the dorsal line is broken, being absent on two subsegments of each somite; chevrons dark purple at the edge but only speckled with purple on a white ground elsewhere; on the 5th to 9th abdominals the markings are red-brown with purple and white speckling and a purple outer edge; the supraspiracular band is heavily speckled with purple on the thorax; on the abdomen it is edged above and below with purple and lightly speckled with purple except that opposite the point, where the chevrons impinge on it, it is completely filled in with light red; the anterior prolegs are light red-brown and the anal prolegs deep purple; the subspiracular and ventral surface purple, but not so dark as in the second form.

The anal plate is broad, truncated, and slightly concave; there are two triangular dark marks on it, the apex of the anterior one pointing towards the anal end and that of the posterior one pointing in the opposite direction, the apices united by a slight darkening of the whitish ground colour. The triangles are bordered by a whitish line and outside this there is an indistinct curved dark line, a continuation of the subdorsal band. Microscopically the head is seen to be rough with numerous irregular ridges and its setae are pale in colour and of medium length; the skin of the body is covered with small polished circular plaques; the tubercles are extremely small and black with almost imperceptible setae; the spiracles are round, small, and black.

In general appearance the larva is very like the coloured plate of *Psodos bentelii*, Ratzer, f. *zermattensis*, Wehrli, and *P. trepidaria*, Hb. f. *gracilis*, Wehrli, published by Wehrli and Imhoff (*Mitt. d. Schweiz. Ent. Ges.*, 1921, 13, Taf. 10, figs. 2 and 3) and reminds one of a young larva of *Gnophos obscurata*.

The moth is very common in the odd years and scarce in the even ones, which suggests that it has a two year life cycle. In 1942, Mr R. C. R. Crewdson tried to breed it from the egg. He kept his larvae in a tin in a room without a fire until the late autumn and then put them out on to a window sill until the cage was blown over. After that he kept them in a warm room all the winter. He found they would eat heather, bilberry, crowberry, and *Alchemilla*, and they fed steadily though sparingly through the winter months, but early in the year they died one by one until a single sickly one was left. I received this one on 6th March, but it had died on the way. It was very small and appeared to be in its third instar, and would probably not have been so big if it had lived during the winter on the top of a mountain instead of in a warm room. Mr Crewdson tried to breed it from the egg again and succeeded in keeping eight larvae alive through the winter of 1943. They were kept in a cage out-of-doors shaded from direct sunlight for part of the time and just inside an open window for the rest of the time, and were fed on sprigs of crowberry placed in water. They appeared to be healthy and were feeding on 9th May, but were only about 9 mm. long, and five of them were still alive on 23rd August. In his letter

he said that they were almost certainly going to pass a second winter in the larval state. Like the others they were probably more forward than they would have been if they had been living under natural conditions at an elevation of more than 2000 feet. Their size contrasts with those found wild by Mr Richardson in 1943 and again in 1944, which were almost full grown at the end of April.

I think that under natural conditions the larva passes through one winter when very small, probably in its second or third instar and passes a second winter in its last instar, when nearly full grown, without a true diapause at any period of its life. The mountain tops are very cold, especially at night, and are often covered with snow until the middle or end of April, so that it is unlikely the larva would begin to feed until the latter half of the month. Unfortunately I can throw no light on this, because neither my small nor my large larvae survived the winter out-of-doors. I do not think the fact, that all the *Psodos* larvae kept in confinement by May and Fleischmann, Wehrli and Imhoff, and myself reached their last instar in November of the first year, is against this supposition.

COLLECTING NOTES.

THE RISE OF PHALERA BUCEPHALA ON RHUM.—Although *P. bucephala* was regarded as not uncommon on the Isles of South Rona and Raasay, until last year (1943) it had never turned up on Rhum, in spite of the fact that we had beaten practically every isolated patch of trees in the island. However, in August last, the larvae abounded on oak in the gorge of the Allt na h-Uamha, and on *Salix atrocinerea* in an old stream bed on the adjoining moorlands. This year it has occurred everywhere to the north-west of this, on hazel in Kinloch Glen, on *Salix viminalis* on the north shore of Loch Scresort and on birch, alder and *S. atrocinerea* on the south side of the same sea loch. The broods seem of very different ages for many have just been hatched, whilst others are in their last instars.—J. W. HESLOP HARRISON, Isle of Rhum, Inverness-shire.

PONTIA DAPLIDICE, L., NEAR RUISLIP, MIDDLESEX.—On Thursday, the 15th of June, in a field near the River Pinn at Eastcote, near Ruislip, Middlesex, I caught a "Bath White Butterfly" (*Pontia* (*Pieris*) *daplidice*), ♂, in perfect condition. I took it up to Mr Ford, at 36 Strand, and he advised me to write to you. I should be pleased to know if there have been any other specimens caught this year.—ALAN J. HANKS.

SALIX CAPREA, L., AS A FOODPLANT OF PHEOSIA TREMULA, CLERCK.—*Salix caprea*, L., is given in some of the textbooks as a foodplant of this species, but I have never found the larva thereon in any part of the country which I have "worked" entomologically. This year I have taken, on various dates, five eggs of the species from aspen and poplar and have put the emergent larvae on *Salix caprea*. Great care was taken to ensure success, but in each case the larva refused to eat the proffered food. The only species of *Salix* on which I have ever found these larvae is *alba*, L. In the Hebrides Dr G. Heslop Harrison found it on "willow" (*Ent. Rec.*, xlix, 30). Have any readers of this Journal ever found it in the wild feeding on *Salix caprea*, or indeed on any species of *Salix* other than *alba*, L.?—P. B. M. ALLAN.

CURRENT NOTES.

IN recent numbers of the *Entomological News* (Philadelphia) R. Whitaker and D. B. Stallings have been discussing Seasonal Variation in Lepidoptera, dealing with Pierid species of the genus *Eurema*. They have described three new forms, two summer and one winter form and pointed out the seasonal forms in each of the species in the genus. In some species the typical form is the summer form. The following is a List of these forms:—(1) *E. daira*, Gdt. f. aest. *jucunda*, B. & L.; (2) *E. palmyra*, Poey.; (3) *E. lydia*, Fldr.; (4) *E. f. hiem. eugenia*, Wallgrn.; (5) *E. nicippe*, Cram. f. aest. *pallens*, W. & S. (nov.); (6) *E. boisduvaliana*, Fldr. f. aest. *ingrata*, Fldr.; (7) *E. mexicana*, Bdv. f. hiem. *rosa*, W. & S. (nov.); (8) *E. proterpia*, Fb. f. hiem. *gundlacia*, Poey.; (9) *E. lisa*, B. & L. f. aest. *immaculata*, W. & S. nov. The Pierid *Nathalis iole*, typical is the summer form; there is added f. hiem. *viridis*, W. & S. (nov.). In some species no seasonal variation had occurred so far. The authors have taken the opportunity to describe *Precis coenia*, Hb. f. hiem. *rosa*, W. & S. (nov.), a Nymphalid winter form.

IN the *Canadian Entomologist* for May J. McDunnough has described three species of the genus *Coleophora* all feeding on *Aster tradescanthi* mainly, and a doubtful ♀ which may represent a still further species. The three new species were bred from three types of cases and subsequently found to possess different genitalic features (minute), which are shown on a plate. All were found in the Ottawa district of Canada. It is a great pity that the cases, the outward visible signs of distinction, are not given on a plate with enlarged figures of the imagines in the interest of the ordinary entomological collectors and observers, who are not expert professional microscopists.

THE first of the Aster-feeding group of *Coleophora* species was described in 1942 by Braun; *C. granifera*, Brn. The three new species are *C. asterosella* (nov.), *C. asterophagella*, nov., and *C. vancouverensis*, nov., with a doubtful ♀ tentatively named *C. laurentella*, nov.? McDunnough also reports the capture of both sexes of *C. quadruplex*, McD., of which previous only the ♂ had been taken around *Achillea millefolium* at Parrsboro, N. Scotia.

THE Annual Report of the Smithsonian Institution for 1942 has just come to hand. As usual, besides the Summary of the activities connected with the Museums there are a number of the outstanding articles on the main topics in most branches of the Sciences. There is very little Natural History, and of Entomology there is only one article and that on "The Insect Enemies of Cereal Crops." Perhaps the article of most general interest is "The Industrial Development of Synthetic Vitamins," which no doubt will dispel the erroneous view which some of us had that the so-called "vittamins" (sic) were only terms in a stunt for propaganda purposes.

ONE of our colleagues has called attention to what he calls "a modern and stupid craze" for referring to numbers of volumes in Arabic (instead of Roman) and he has given one more example of such. A correspondent had the volume reference originally in Arabic (as 11), misread it as II (Roman) and copied it as 2 (Arabic). Had he written it originally as XI no such error would have been possible. The old roman plan seems the better and only occasionally clumsy (LXXXVIII).

The Names and Forms to be considered :

tincta, Brahm (1791), *Kalend.*, II, 394.

trimaculosa, Esp. (1789+1?), *Abbild. Noct.*, IV (2), 400, Syn.

hepatica, Hb. (1800-3), *Samml. Noct.*, 77, Syn. (*Text*, 190, *hepatica*, corrected to *tincta*).

argentina, Haw. (1809), *Lep. Brit.*, 186, Syn.

ab. *suffusa*, Tutt (1892), *Brit. Noct.*, III, 69.

ab. *obscurata*, Stdgr. (1897), *Iris*, X, 335.

Tutt dealt with: (1) the typical form and (2) ab. *suffusa*.

trimaculosa, Esp., *Abbild. Noct.*, IV (2), 400 (1789+).

FIG.—*l.c.*, 131, 5 (1787?). Not good, but roughly recognizable. Syn.

hepatica, Hb., *Samml. Noct.*, 77 (1800-3); *Text*, Hb.-Gey., p. 190 (1834) [A Syn.]

FIG.—*l.c.*, 77.

ORIG. DESCIP.—“Pale greenish-grey; the head dull coloured; the neck blackish marked; the thorax dark, light edged and black marked; dusky leather-brown band in which the usual stigmata lie, and with pale waved lines of which only the outer is distinctly developed, the underside marking is suppressed; the hindwing is banded with ashy-grey shading; the abdomen similarly gray.” *tincta*, Brahm, *trimaculosa*, Esp., *occulta*, Fb., *hepatica*.

argentina, Haw., *Lep. Brit.*, 186 (1809). A Syn.

ORIG. DESCIP.—“*Alis cinereo-argenteis nebulosis, strigis variis undulatis,*” “*Statura penultima (grandis) cui simillima, at satis differt primo intuitu, nam pulchrior est, et longe magis nitens atque argentata.*” He saw only five examples, *N. hepatica*, Hb. 77 (nec *hepatica*, L.). See *Text* of Hb.-Gey., p. 190 = *tincta*, Brahm (1834).

race *obscurata*, Stdgr., *Iris*, X, 335 (1897).

ORIG. DESCIP.—“Two females from Apfelgebürges are smaller and darker than European specimens; their forewings are far more uniform in colour, without the light blue-grey of typical *tincta*; the marking are partly obsolescent.”

Hampson, *Cat. Lep. Ph.*, V, 112 (1905). “Smaller and darker.” Amurland.

Aplecta, Gn. (1841-1852), Dup., Tutt, Sth., Warr., Drdt. [*Polia*, Ochs. & Tr. (1816-25), H.-S., Hamp., Drdt.; *Melanchra*, Hb. (1820), Meyr., Meyr.: *Mamestra*, Hb. (1821), Stdgr., Splr., Sth., Culot, Drdt.] *advena*, Fb. (1787).

Tutt, *Brit. Noct.*, III, 70 (1892): Meyr, *Handb.*, 85 (1895): Barr., *Lep. Br. Is.*, IV, 154, plt. 1 (1897): Stdgr., *Cat.*, III ed., 155 (1901): Hamp., *Lep. Phal.*, V, 110 (1905): Splr., *Schm. Eur.*, I, 168, plt. 136, 10 (1905): South, *M.B.I.*, I, 237, plt. 117, 6 (1907): Warr.-Stz., *Pal. Noct.*, III, 78, plt. 19a, b (1909): Culot, *N. et G.*, I (1), 98, plt. 16, 13 (1911): Drdt., *Am. Noct.*, VII, 96, plt. 14i, h (1924): Meyr., *Revis. H.*, 156 (1928): Drdt., *Pal. Noct. Supp.*, III, 108, 19a (1934).

Schiff., *Verz.*, 77, L. 11 (1775), gave scarcely an indication of this species and no description. Illig., *Neu ausgabe Verz.*, I, 234 (1801), quoted the poor description of Fb., *Ent. Sys.*, III (2), 125, and discussed the previous references to what had been considered to be of this species, Clerck, Linn., Esper, and Bork.

Esper, *Abbild. Noct.*, IV, 694, plt. 178, 4-5 (1789+?), figured and described under the name *advena* quite unrecognizable as such, and which Werneberg said was the *bombycina*, Hufn. (*advena*, Tr.). See *Beitr.*, I, 252 (1864).

Bork., *Naturg. Noct.*, IV, 615 (1792), said he had neither seen this species nor an illustration of it, but relied on the Fab. description, etc.

Hb., *Samml. Noct.*, IV, 81 (1800-3), gave apparently a well executed figure, but no one who wished to identify a British example would consider them the same species. In his text, p. 190, he described it "Clear grey; the thorax pale and black marked; the forewings sprinkled brownish-red in their middle, with whitish dark grey centred reniform and orbicular and pale waved line, beyond which at the outer part is grey with black chevrons; the hindwings are pale brownish-grey; the body is also grey."

Haw., *Lep. Brit.*, 188 (1809), described this species under the name of *nitens*. He said "this comes extremely near to *N. hepatica* of Hb." (above described by the name of *argentina*). But the *hepatica* of Linn. seems to be entirely distinct.

Treit., *Schm.*, V (2), 39 (1826), gave no synonyms, but discussed the various errors in recognition made by previous authors, in their dealing with members of this group, several of which were very rare.

Dup., *Hist. Nat.*, VI, 392, plt. 96, 4 (1826), gave an unusually well marked figure of this species, in fact much of the marking is obsolescent as it should be but the basic brown-grey is the dominant indication, which denotes *advena* rather than *tincta*, which the marking would suggest.

Frr., *Beitr.*, I, 86, plt. 28 (1828), gave a quite unrecognizable figure as this species which apparently was unknown to him and his friends.

Wood, *Ind. Entomologica*, 58, plt. 13, f. 295 (1834), gave a good figure of the British form, uniformly rusty-brown with sparse marking.

H.-S., *Sys. Bearb.*, II, 264 (1850), said that the figure Hb. 81 seldom so sharply marked, and that the rust-red suffusion mostly extended farther forward. His description is "Violet-grey with considerable rust-red suffusion, especially in the discal area, the darkest brown is in cell 1b near the base of the waved line." This does not include the many variegated markings shown in the figures mentioned and shown in figures by some authors.

Gn., *Hist. Nat.*, VI, 81 (1852), referred to Schiff., *Verz.*, to Bork., and to Fab. with a query. He gave *nitens*, Haw., as a synonym.

Barrett, *l.c.*, plt. 154, gave two figures, both with somewhat emphasized marking, and without the glossy appearance which the more unicolorous surface gives.

Stdgr., *Cat.*, IIIed., 185 (1901), included the forms *unicolor*, Tutt, *mongolica*, Stdgr., and *purpurissata*, Grote (pallidior, al. ant. minus brunnescenti-tinctis).

Hamp., *Lep. Phal.*, V, 110 (1905), gave *unicolor*, Tutt, as the only ab. and treated *nitens*, Haw., as a syn. On the same page he treated

mongolica as a species described by Stdgr. (1896) with *adjuncta* also described by Stdgr. (1888) as a syn. (*sic!*), but got confused somehow and placed *mongolica* as Ab. 1 (Gn.) to his description of *adjuncta*.

Stdgr. in his description of *mongolica* in 1896 said it "stood between *advena* and its var. *adjuncta* from the Amur," and later referred to v. *mongolica*.

South, *M.B.I.*, I, 237, plt. 117, 6 (1907), gave a very good figure of "the pale shining brown."

Splr., *Schm. Eur.*, I, 168, plt. 136, 10 (1905), gave so well marked and variegated a figure that those who knew only our British race would fail to recognize it as *advena*. He gave the forms *unicolor*, *nitens*, *mongolica* and *purpurissata*, and added the name *flavescens* for a brown-yellow form.

Warr.-Stz., *Pal. Noct.*, III, 78, plt. 19a, b (1909), gave nine good figures of *advena* ♂ and ♀, *nitens* ♂ and ♀, *unicolor* ♂, *mongolica* ♂ and ♀, *adjuncta* ♂ and ♀ (19b), and included in addition *flavescens*, Splr., but treated *adjuncta*, Stdgr., as a species "larger and broader winged than *mongolica*, Stdgr." Warr. put Schiff. as the prior for *advena*, and treated *advena*, Leech, as a syn. of *adjuncta*, Stdgr., which he treated as a good species.

Culot, *N. et G.*, I (1), 98, plt. 16, f. 13 (1911), gave a very uniformly dark figure with the rusty-brown clouds almost obscured by the dark ground colour, but with very sparse marking by no means clear or distinct. He did not describe it.

Drdt.-Stz., *Am. Noct.*, VII, 96, plt. 14i, h (1924), dealt with *purpurissata*, Grote (plt. 14i), as a true species and included the forms *juncimacula*, Smith (plt. 14i), *crydina*, Dyar, and *apurpura*, B. & McD. (plt. 14h). The figures show that the species certainly belongs to this group of *Polia*.

Drdt.-Stz., *Pal. Noct. Supp.*, III, 108, plt. 19a (1934), described a new form from Zermatt, *scotaea*, Pnglr., *i.l.*, a decided grey-black. (The figure he quoted is not on plt. 19.)

Barrett noted of the Variation:

"An extremely constant species in colour and (absence of) markings."

This is a very curious statement as there certainly is not an "absence of" marking in specimens I have seen (Hy. J. T.).

The Names and Forms to be considered:

advena, Fb. (1787), *Mantissa*, II, 183.

nitens, Haw. (1809), *Lep. Brit.*, 188.

r. *sylvatica*, Bellier (1861), *Ann. Soc. Ent. Fr.*, 29, plt. 2, 11.

purpurissata, Grote (1864), *Proc. Ent. Soc. Philad.*, III, 82, plt. 1, 5.

[Amer. species ? teste Hamp., V, 70.]

f. *adjuncta*, Stdgr. (1888), *Stett. e. Zeitg.*, XL, 249. [= ? *mongolica*, Stdgr., teste Hamp.]

ab. *unicolor*, Tutt (1892), *Brit. Noct.*, III, 70.

ssp. *mongolica*, Stdgr. (1896), *Iris*, IX, 253. [A species ? teste Hamp., V, 110.]

ab. *flavescens*, Splr. (1905), *Schm. Eur.*, I, 168.

ab. *scotaea*, Drdt. (1934), *Pal. Noct. Supp.*, III, 108.

Tutt dealt with: (1) *advena*, Fab., reddish-grey along the costa; pale towards outer margin; (2) *nitens*, Haw., tinged with glaucous, and (3) *unicolor* dark reddish-grey.

race *sylvatica*, Bell., *Ann. Soc. Ent. Fr.* (1861), 29.

FIG.—plt. 2, f. 11.

ORIG. DESCRIP.—“Griseo fusca; alis anticis lineis duabus—nigris maculisque ochraceo-albidis; posticis puncto centrali et linea obscuriore; fronte villosa; abdomine crenato. Omnibus alis puncto centrali et lineis brunneis subtus late signata.”—Habitat, julii, in Corsicae sylvis.

“Ailes d'un brun grisâtres et traversées par deux lignes noires bien écrites, entres lesquelles les taches ordinaires, plus claires que le fond et un peu ochracées, se détachent nettement: la subterminale est peu dentée, d'un gris blanchâtre et bordée intérieurement par de petits traits noirs cunéiformes. La base de l'aile et le bord interne sont marqués d'une grande tache blanchâtre, beaucoup plus apparente que toutes les autres. On voit aux ailes inférieures un point central et une bande brune qui les traverse en entier. Le dessous est d'un gris clair brillant, le point central y est plus visible qu'en dessus, et les quatres ailes sont traversée par une ligne brune, épaisse, qui est simple aux supérieures, mais denticulée aux inférieures. Jambes assez velues et pattes annelées de brun et de blanc.”

race *mongolica*, Stdgr., *Iris*, IX, 253.

ORIG. DESCRIP.—“Three specimens brought from Kuren, which Habermayer took in numbers at Urga in 1895 and which I will here designate as *mongolica*. The specimens vary much from one another stand between *advena* and its var. *adjuncta* from the Amur area, they are nearer to the latter form, single examples from Urga with forewings preponderatingly brown are not to be separated from undoubted *adjuncta*. A few *mongolica*, as one male from Kuren, have lighter grey forewings than German *advena*; but they give one a distinct impression, for they either show no brownish colour, as the male from Kuren, or on the other hand this colour is far more restricted and appears somewhat different. Most *mongolica* have far darker (dark grey, slightly brown tinged) forewings such as occur in *advena*; the darker specimens of var. *adjuncta* are easily to be distinguished, in that they are almost only or at least prevailingly brown suffused. A further distinction of v. *mongolica* is this, that the wings on the underside are darker without brownish suffusion, the underside of the forewing is dark blue-grey. The *advena* of Kentei come somewhat near *mongolica*, but they are on the average browner coloured.”

ab. *flavescens*, Splr., *Schmet. Eur.*, I, 168 (1905).

ORIG. DESCRIP.—“With pale brown-yellow forewings.” From Bukowina.

ab. *scotaea*, (Pnglr.), *Drdt.-Stz., Pal. Noct. Supp.*, III, 108 (1934).

ORIG. DESCRIP.—“Is a very remarkable, large dusky aberration which is quite grey black; in consequence of the dense dark suffusion the markings are scarcely discernible.” Zermatt.

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Royal Entomological Society of London, 41 Queen's Gate, S.W.7: First Wednesday in the month at 3.30 p.m. *South London Entomological and Natural History Society*, Chapter House Hall, St Thomas' Street, S.E.1: Second Saturday in the month at 2.0 for 2.30 p.m. *London Natural History Society*, London School of Hygiene and Tropical Medicine, Keppel Street, Gower Street, W.C.1: Indoor Meetings discontinued at present.

Communications promised:—T. B. Fletcher, Dr E. A. Cockayne, J. E. Collin, H. Donisthorpe, Dr Malcolm Burr, E. P. Wiltshire, H. A. Leeds, Prof. J. W. Harrison, Hy. J. Turner, B. K. Lawrence, A. H. Sperring, Prof. F. Balfour-Browne, Russell James, P. Siviter Smith, T. Greer.

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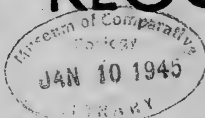
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ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION



EDITED with the assistance of

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SUPPLEMENT:

The British Noctuae and their Varieties, Hy. J. Turner, F.R.E.S.,
F.R.H.S. (169)-(172)

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ALTERATION OF DATE OF JANUARY AUCTION SALE.

SALE on THURSDAY, 18th January (not on 17th as printed in Advertisement).

ON VIEW, WEDNESDAY, 17th January.

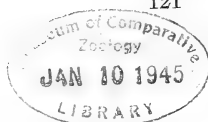
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MONTGOMERYSHIRE NOTES.

By P. B. M. ALLAN.

13, 820



In the following notes no mention is made of weather, since climatic conditions in the Welsh hills are usually very different from those in England. Rain and storm often prevailed when the wireless announced fine hot weather "in the Straits of Dover." Summer was very brief: it occurred on Saturday, 17th June. All species mentioned as emerging in my cages were from larvae collected (or eggs laid) here in 1943.

Trunk and fence searching was carried on throughout the first three months, but it was not until March 13th that the first moth, a female *D. fagella*, was found. On the 25th the sun shone; *B. parthenias* was seen and hibernated *V. io* and *V. urticae*. The following day three *P. c-album* were noted and on the 28th *O. incerta*. Sugar on 3rd and 4th April attracted only *C. ligula* and *C. vaccinii*. The first *E. cardamines* was seen on 26th April; on the 27th *A. euphrosyne* and several more *cardamines*, with two *L. chlorosata*; and on the 28th *S. malvae*. A full-grown larva of *E. fasciaria* and a dozen of *Thera firmata* were collected from spruce. On the last day of the month I netted, to my astonishment, a worn specimen of *Hemaris tityus*, and at larches on a hilltop a worn *L. argiolus*—the second I have seen in this county.

May began with a *P. meticulosa* found asleep, and on the 3rd *Epirrhoë tristata* and *E. tages* occurred. *L. suffumata* began to emerge in my cages. The first *C. pamphilus* was noticed on the 7th, and on the 8th *P. macularia*, *E. lariciata* and *E. alternata*, on which day also a female *N. anceps* (*trepida*) emerged from a pupa dug last year. She was used for assembling and later enabled me to distribute some 300 eggs among friends and correspondents. On the 9th *P. megera* was seen. A *C. mendica* female, who also laid eggs, was caught on the 11th, with a female *E. bistortata* (very scarce this year), who followed suit. *B. prasinana* and *E. hastata* (unusually common) were netted on the 12th. Next day *T. duplaris* and *S. lunaria* were noted. Larva beating in the middle of the month produced *O. dilutata*, *A. pyramidea*, *P. populi*, *T. quercus*, and showers of *O. miniosa*—abundant since (?) this was a remarkable year for galls, the oak catkins being festooned with *Spathegaster baccarum*, a food beloved of the Blossom Underwing. I took a web containing forty 2nd instar larvae and obtained only eight pupae, thirty-two larvae having been smitten by an *Apanteles* sp.

From elm, in May, larvae of *C. gilvago* and *A. circellaris* were collected; from oak *B. prasinana*, *T. crataegi* and *C. elinguaris*. On the 19th *P. icarus* and *E. silacea* were netted, as well as a female *X. ferugata* who laid eggs. On the 24th I saw, at some distance, a black *B. betularia* sitting sideways on the smooth silver trunk of a *Castanea sativa*, and on approaching to investigate its unusual attitude I found, when within a yard of it, that it was paired with a female of the type who was quite invisible against the grey background. Doubtless stamina avails more than procrypsis and this is a risk that must be run. It is the first time I have seen the black form in Montgomeryshire, numbers bred from captured females during the last four years having all been of the type. On the 24th also four or five *C. rubi* appeared close to the house, and the first *A. selene* and *E. aurinia* were noticed, also *C. punctaria*. On the 27th *D. trimaculata* began to emerge in the cages and a

female was used to assemble and furnish eggs. During the last few days of the month I caught or noted *T. variata*, *M. albicillata*, *O. designata*, *P. dolabraria*, and *D. pudibunda*.

At the beginning of June *S. ocellatus* and *P. palpina* emerged in the cages. Sugar on the 2nd produced only two specimens, *P. nebulosa* and *M. trigrammica*. Next day I beat *Allophyes oxyacanthae*, silver-grey and full grown, from crab-apple and cherry, and saw several *D. falcatoria* on the wing. On the 5th I searched birches and found *A. flavicornis* in unusual profusion—about twenty on one bush—from 2nd instar to full grown. *D. porcellus* flew nightly at rhododendrons, but sugar yielded only *A. rurea*, *A. exclamatoris*, one *H. nana*, and a dishevelled *R. umbratica* (*tenebrosa*). On the 9th and 10th I collected larvae of *P. ridens*, *S. revayana*, and *D. ruficornis*. On the 12th *H. tityus* was seen and on the 17th a batch of Arctiid eggs was found on hawthorn. These resolved themselves later into *S. lutea*, the Buff Ermine, a moth which I have not previously noticed in this part of the world. *M. jurtina* did not appear until the 17th, on which date males of *C. margaritata* flew commonly at dusk and *E. fasciaria* emerged in the cages. On the 19th a number of *E. haworthiata*, from larvae collected from a clematis bush in the garden last year, began to emerge, with a solitary *A. leporina*; and on the 20th I netted to identify, and released, a male *A. aglaia*. Dusk on the 25th brought various common Geometers, among them *C. fulvata* and *E. pulchellata*. Sugar attracted nothing at all. I finished the month by collecting pods of Red Lychnis containing *Dianthoecia* larvae.

At dusk in the garden, 1st to 5th July, I netted *L. pyraliata*, *P. chrysitis*, *L. pallens*, *C. margaritata* (female), *E. haworthiata*, *Z. tarsipennalis*, *O. sambucaria*, *C. repandata*, and *G. pumilata*. On the 6th I collected from birch some *N. dromedarius* and *A. leporina* in first stadium, and on the 7th to 10th netted *L. prunata*, *H. proboscidalis*, *C. amata*, *S. biselata*, *H. humuli* (female), *L. impura*, *P. strigilis* v. *aethiops*, and various common Geometers. *X. ferrugata*, bred from eggs obtained on May 19th, began to emerge. On the 23rd a solitary *M. stellatarum* visited the garden, and from birch next day I collected two *C. coryli* (2nd instar), five *T. duplaris* (2nd and 3rd instar), two *B. prasinana* (2nd instar), several *E. hastata*, and a full-grown *S. bilunaria*. *A. paphia* and *E. semele* were now on the wing in moderate numbers.

Ill health kept me indoors most of August, but round about the house I noted, on the 4th, several *A. paphia* (mostly females), *P. c-album*, *E. semele* (mostly females), *T. quercus* (females), *P. icarus* (commoner than I have previously seen it in this county), *L. phlaeas* (ditto), *M. tithonus* (abundant), *E. tages*, and watched a female *A. cydippe* feeding at a burdock. On a short walk on the 8th I saw the first *P. aegeria* I have ever seen in these parts—a very tattered male. From some aspens on this day I collected eggs of *P. tremula* and *N. ziczac*. *O. chenopodiata* (*limitata*) rose from the grass at one's feet almost everywhere. On the 9th I sugared and attracted one *T. pronuba*, one *A. monoglypha*, and one *A. pyramidea*. In the garden *E. icterata* race *subfulvata* was netted. By this time all the bats had gone—they are unusually plentiful here; far too plentiful for the moth-hunter. But the Noctuidae were so extraordinarily scarce this year that doubtless the bats betook themselves, like *Lycidas*, to fresh woods and pastures new. Certainly the four which

customarily did sentry-go along my sugaring beat disappeared in July, and not a bat was seen anywhere here in August though watched for each evening.

On 12th August a male *P. fuliginosa* was found in a spider's web on the coach-house door, and *C. icteritia*, bred from catkins, emerged, with *C. lutea* the following day; both, in my experience, early dates. On the 16th *A. chi* was seen at rest on a patch of green moss and therefore was conspicuous several yards away: presumably it had been disturbed from some more suitable background; and a pair of *A. tragopogonis* were found *in cop.* under a piece of loose bark on an alder. They remained conjoined until 4 p.m., and it was not until 1st September that the female began to oviposit. On the 17th *A. circellaris* emerged; this moth was abundant later at sugar. Very little work could be done during the rest of August and in September, but I saw *E. protea* on a trunk on 25th August, and on the 30th *T. crataegi* and *C. ligula* emerged in the cages. On 1st September a solitary larva (3rd instar) of *P. tremula* was noticed on aspen.

During September several *C. nupta* were brought to me, and on the 12th larvae of *C. coryli* and *B. prasinana* taken from beech. Heads of *Angelica sylvestris* in a dark boggy wood yielded several larvae of *E. trisignaria* and *E. tripunctaria*. Sugar in the garden on the 14th produced *A. pyramidea*, *L. fimbria*, *T. pronuba*, *T. comes* (*orbona*), *A. ipsilon*, *H. micacea*, *A. c-nigrum*, *A. xanthographa*, *P. meticulosa*, *C. circellaris*, *P. gamma*, *C. clavipalpis*, *C. vaccinii*, *C. gilvago*, *A. secalis*, and *A. lychnidis*. *G. ornithopus* was unusually common this year, both here and at my home in Hertfordshire.

No field work was done during and after October, but sugar was spread on posts, etc., outside the front door on several evenings up to 3rd November. The only species seen were *C. vaccinii* and *C. ligula* (both in great profusion and variety), *C. circellaris*, *P. meticulosa*, *E. transversa* (*satellitica*)—about six of the grey form—*O. dilutata*, and *A. oxyacanthae*. On 17th October a foreigner appeared (not yet identified), and on the 30th *X. exoleta*.

The resemblance of 1944 lepidopterologically to 1893 was remarkable, and a perusal of Volume IV of this Journal is instructive.

REMARKS ON XANTHIA AURAGO.

By Capt. C. Q. PARSONS.

Barrett states that the Rev. H. H. Crewe used to see this insect flying backwards and forwards on the outskirts of Beech Woods in the sunshine between 4 and 5 p.m. I have frequently seen references to its being taken at Ivy, Sugar, and Light, but not to its behaving in this manner.

On the other side of my lane, in Seaway Lane, Torquay, there is an old garden about 200 yards long bordered by some old Maples about 40 feet high. Last autumn I frequently used to sit at a window in an upper room between 4.30 and 5.15 (G.M.T.) facing across the lane. One afternoon I noticed a small yellowish-pinkish Noctuid flying about the tops of the Maples in the sunshine. The following days were still and

sunny, when I noticed as many as five at a time flying high up backwards and forwards. I managed to get a glimpse of them in a pair of binoculars, but on going into the lane they never came lower than 14 feet and then only for a few seconds at a time. I put a freshly emerged ♀ in a cage suspended from a lower branch of a sallow tree, but she showed no sign of activity at that time of day, and attracted no suitor on that or the following night.

If I had not sat in that room I should never have noticed *aurago* in the sunshine.

The sun has been almost non-existent between 4 and 5 p.m. (G.M.T.) this autumn, and when it has been shining there has generally been a high wind. *Aurago* has not appeared in daylight; but four came to a solitary ivy bush just inside my gate in one night. One or two come annually.

I have kept six females from time to time for ova and have only once been successful. On this occasion she scorned the beech twigs and laid profusely all over the muslin lid. The other five must surely have been virgins; they were certainly not faded.

I planted a small sycamore in a flower pot in preparation for these ova in the spring. I think it was April when the terminal buds just opened and the very young leaves started to just flatten out. I pinned on to them small pieces of muslin containing the eggs and left the pot uncovered. Shortly after this I noticed a few newly hatched larvae hanging down on silken threads, so hoisted them up again. This procedure continued for the best part of a week during the period of hatching. The larvae were not happy on the just opened leaves and lowered themselves again out of sight. The few remaining I put into glass-topped boxes with unopened buds, when they promptly nibbled their way into them and disappeared as recommended by the text books.

NEW FOREST AND DISTRICT NOTES.

By S. G. CASTLE RUSSELL.

Following my notes in your issue of last August which chronicled collecting notes up to the 22nd of May 1944, lepidopterous insects after this date showed no improvement in numbers generally and the weather also was distinctly unfavourable.

The Argynnids, *euphrosyne*, *selene*, *cydippe* and *paphia*, were all exceedingly scarce. *Selene* was never found in any numbers and *aglaia* was not seen at all. This species has almost entirely disappeared from the Forest in recent years. A long walk through one of the largest enclosures on a sunny day from 10 a.m. to 5 p.m. disclosed not more than 100 *paphia*, nearly all males, and not a single example of var. *valezina*. A few *cydippe* (*adippe*) were seen in the open areas where a few seasons ago they were very abundant. *Limenitis camilla*, Linn., was also scarce. An odd *Thecla quercus*, Linn., was seen and an occasional *Lycaenopsis argiolus*. *Aphantopus hyperantus*, Linn., was about in better numbers than last season but, even so, was by no means in the quantities that used to occur in past years.

Most of the areas favoured by the above-mentioned butterflies have been over-run by timber hauling and cutting, which presumably would

interfere with their breeding activities. On the other hand, in certain of the enclosures there are areas that have not been interfered with in the least, and are in perfect condition for Lepidopterous life, yet insects are just as scarce in these areas.

As regards *Argynnis paphia*, a feature of last season was the extraordinary scarcity of females, and on one occasion during a day's collecting the ratio was one female to 50 males. This may have had an effect on the number of insects during this season.

Two examples of *Nymphalis polychloros* were seen in July and this was the first time I have seen this species in July for very many years.

Polyommatus icarus, Rott., was but rarely seen, and *Plebejus argus* (*aegon*), Linn., was entirely absent from its ancient domain at Beaulieu Road and but a few in evidence in other parts of the Forest.

Although a good search was made, not a single moth of any kind was found on tree trunks in the Forest.

In the Highcliffe district the only species that occurred in any numbers were *Maniola jurtina*, Linn., and *Maniola tithonus*, Linn., but neither occurred in the usual abundance. In early May males of *Pararge megera*, Linn., began to appear but no females were seen until early June, when both sexes became plentiful. Only two examples of a third brood were seen, which last season were very plentiful up to the first week in November. I was much interested in watching the antics of several pairs of this species. The females in their customary manner sat open-winged on the ground with their abdomens raised. The male contacted with the head of the female and made frequent and violent charges, so much so that the female was pushed back quite a distance and the male sometimes was carried right over the lady and did a series of acrobatics. This play went on for some time but no attempt at pairing was made by the male. Probably the female had been paired before.

Heodes phlaeas, Linn. This species was unusually scarce in the early summer but, in spite of this and the unfavourable weather, provided a small brood which was on the wing from early September until the end of October. A larger proportion of the abs. *caeruleopuncta* and *cupreo-puncta* than usual, occurred.

On the local railway bank, which is favoured by all the species that occur in the district, I netted two examples of *Melitaea cinxia*, Linn., which were released. These may have come over from the Isle of Wight or from a small colony domiciled on the Undercliff about a mile away from the bank. On a day in September I am almost certain I saw an example of *Argynnis lathonia*. I had a good view of it, but before I could get near it flew over the line to the opposite bank and disappeared.

In early August a journey was made to the Winchester area in search of *coridon*, but it proved futile, as the two localities visited (far apart) had been ploughed up after a miserable crop. Needless to say the food-plant no longer exists.

In 1917-18 one could select up to 50 *Polyommatus coridon*, per day, but here again they became extinct, together with all the typical *coridon*, owing to some disease. Last season I went to Winchester and found the whole area taken over by the Air Force and ruined for ever. I never saw, or heard, of one at St Catharine's Down.

The season generally has been the worst one that I can recollect and this experience is confirmed by other local collectors I have come into

contact with. All my breeding activities have been futile owing to the death by disease of the larvae and pupae. I have found so many dead larvae of the *Vanessa* sp. on nettle, etc., that I am inclined to think that and epidemic disease has had a great deal to do with the unusual scarcity in this district.

Let us hope that next season will show an increase of numbers and opportunities to collect under more comfortable and less strenuous conditions.

THE LENGTH OF THE LIFE-CYCLE IN INDIA.

By D. G. SEVASTOPULO, F.R.E.S.

In a short note (1944, *Entomologist's Record*, lvi, 47) Mr Russell James mentions a life-cycle of 37 days from hatching to emergence for a forced brood of *Caradrina ambigua*, to which Mr Bainbrigge Fletcher adds a remark that the allied *Laphygma exigua* has been known to complete its life-cycle in three weeks under normal conditions in India. I find that I have a number of records of the life-cycles of various species reared during the last few years in India, which may possibly be of interest.

		Ovum laid.	Ovum hatched.	Pupated.	Emerged.	Laying to emergence.	Hatching to emergence
						Days.	
SATYRIDAE.							
<i>Mycalesis visala</i> , Moore	..	6.viii	9.viii	24.viii	30.viii	24	21
<i>Mycalesis perseus</i> , F.	...	28.iii	31.iii	14.iv	20.iv	23	20
<i>Ypthima hubneri</i> , Kirby	..	30.vi	6.vii	24.vii	31.vii	31	25
<i>Melanitis leda</i> , L.	...	25.ix	29.ix	15.x	21.x	26	22
SYNTOMIDAE.							
<i>Amata passalis</i> , F.	..	24.viii	29.viii	8.x	16.x	53	48
<i>Amata cyseae</i> , Stoll.	...	9.ii	15.ii	12.iii	21.iii	40	34
LASIOCAMPIDAE.							
<i>Trabala vishnu</i> , Lef.	...	—	24.iv	20.v	31.v	—	37
SPHINGIDAE.							
<i>Herse convolvuli</i> , L.	...	4.x	7.x	23.x	3.xi	30	27
<i>Cephonodes hylas</i> , L.	...	—	6.ii	1.iii	14.iii	—	36
<i>Deilephila nerti</i> , L.	...	23.vii	30.vii	12.viii	23.viii	31	24
<i>Thereetra oldenlandiae</i> , F.	...	22.vii	25.vii	7.viii	17.viii	26	23
<i>Thereetra pinastrina</i> , Mart.	...	—	23.viii	5.ix	15.ix	—	23
<i>Rhyncholaba acteus</i> , Cr.	...	—	25.ix	8.x	20.x	—	25
NOCTUIDAE.							
<i>Sideridis venalba</i> , Moore	...	16.i	24.i	20.ii	28.ii	43	35
<i>Mocis undata</i> , F.	...	30.x	2.xi	30.xi	13.xii	44	41

Possibly a clearer idea of the rapidity of development can be got from the fact that in the *Sphingidae* moults take place at intervals of 48 hours.

Calcutta, 14.ix.44.

COLLECTING NOTES.

LEPIDOPTERA IN THE PULBOROUGH DISTRICT OF SUSSEX IN 1944.—I have been very largely housebound during the greater part of the past season for reasons unconnected with the weather, and so can give but a poor account of collecting in 1944.

I found the larvae of *Atethmia xerampelina* (*A. centrigo*, Haw., as I think it should be) extremely plentiful in the early Spring, due in part, no doubt, to my habit during these last few years of collecting very large numbers of these larvae, breeding the moths in the hope of good forms and then returning ninety-nine per cent. of them to the trees from which the larvae came.

Among a number of interesting colour variants of the usual *centrigo* with its clearly defined bands, there occurred three unicolorous forms, rich carnation-red (*unicolor*, Stdgr.), purple-red or dark brownish-red (*obscura*, Cockerell), and golden-yellow (*lutea*, Brombg.). [See Turner, *Noc. and Vars. Supp. Notes*, III, 54.]

This last is described by Bromberg as citron-yellow. Mine are certainly very different from the orange-tinted yellow of the ordinary *centrigo* ground colour. His type specimens had a very narrow red outer band and no central band. My best example has no band at all, but others (2) I have bred in other years have a distinct reddish tinge on the extreme outer margin and no doubt all are variants of a single form, the opposite in development to forms *unicolor* and *obscura*.

A fourth nearly *unicolor* form appeared, very deep smoky-saffron in colour, and without the pale lines edging the central fascia being specially noticeable, as they are in *unicolor* and *obscura*. I hope to deal with this apparently new form when I have obtained a better range of intermediates between it and *centrigo* than I have now, and can be sure of the line along which it has been developed. It is quite distinct from *ab. rufescens*, Turner, which I have from Lewes but have never bred here.

This year, as always (at least in this area), the extreme forms collectively are well below 1% of the moths bred.

The Spring brood of *Lycaenopsis argiolus* was very abundant, far more so than I have seen these last twenty years, and I found the larvae of *Ruralis betulae* more plentiful than usual in the hedges.

I could not get away as far as the place in which I took the *A. iris* larva that produced a large ♀ *ab. iole* in 1943, but a hurried search for these larvae in nearby spots, where usually I can find it, was fruitless, and I gained the opinion that it was very late or scarce this year.

A large batch of pupae, *Nonagria geminipuncta*, taken in a local pond produced a fair number of very black forms (*nigricans*, Stdgr.), nearly all ♂♂, while from a few pupae, *P. typhae*, taken in a Sussex pond, I bred an extreme black form of *ab. fraterna*; too black, as I think, to be included under this name.

Polyommatus icarus was very abundant in late June in a marshy field here, the ♀♀ being exceedingly blue. Some when on the wing were hard to distinguish from the ♂♂.

Despite hordes of larvae, *A. urticae* and *V. io* seen on the nettles, neither species appeared really common later in the year, but both *P. comma* and *V. atalanta* were abundant in early autumn.

C. nupta turned up in the traps put for wasps around the beehives, and so, incidentally, did a number of hornets.

From the end of August, when the *A. xerampelina* having emerged and been distributed in their haunts, I could get out for a little sugaring, I found the usual common autumn Noctuae to be very plentiful and sugar very attractive.

A few species were definitely less plentiful than usual, among them *X. aurago*, *X. socia*, and *O. ligula* (possibly not fully out); against this, species specially abundant were *X. ornithopus*, *O. vaccinii*, and *M. circellaris*, which were on every patch, in force.—A. J. WIGHTMAN, "Aurago," Pulborough.

OBITUARY.

W. G. SHELDON, F.R.E.S., F.R.H.S.

W. G. SHELDON had been a friend since I met him in the mid '80's on Shirley Heath one evening while dusk. We both then had to "make our way," and he was eventually very successful. The British Lepidoptera were his favourite pursuit then and so it was to the end of his days. When the late J. W. Tutt was in the height of his entomological work in the last ten years of 1800's and in the first twenty years of this century, and when Chapman was working year by year in continental areas, Sheldon was one of those, and there were many, who enthusiastically collected abroad. But Sheldon still loved the British Lepidoptera and spent much time in working on the smaller species, in particular the Tortrices. His journeys included Sarepta on the Volga, Herculesbad, The North Cape, as well as the S. of France, the Alps, Spain, etc. Later on he went to the N. of S. America.

For many years he had been a member of the well-known S. London Entomological Society, and in due course he joined the Fellowship of the Entomological Society of London. There he was induced to take over the post of Treasurer. His good business capacity and his desire to raise the status of the Society, which was then lodged in another Society's inadequate rooms, were placed at the service of the Council. A considerable sum was raised in debentures by his efforts and permanent premises were bought near the British Museum (Nat. Hist.) in S. Kensington. Finally, with the united co-operation of the Fellows under his arrangement, the whole of this loan was repaid, and the Society was placed on a substantial financial footing free of debt, with adequate accommodation and comfortable surroundings affording full access to its very well equipped Library. In fact he was a "great chancellor."

As a man he was somewhat reserved, but a reliable and staunch friend to all who knew him, and it was a real pleasure to be with him in the field and note his ability and acquired knowledge. A visit to his residence at Oxted, Surrey, gave an insight into his other activities. He was a gardener, and many were the choice plants he grew. Well do I remember a large bed of *Gentiana acaulis* in full bloom and the wonderful "blue poppy" (*Meconopsis*). His love for the Wicken Fen area led him to the National Trust, of which he became a Member of its Council.

Other activities took more of his free time, and only in the last year of his life did illness slow down his energy. He was in his 85th year at the time of his death.—HY. J. T.

REVIEW.

"TALKING OF MOTHS," by an Old Moth Hunter.—This interesting book, sent for review nearly twelve months ago, was delayed at first for want of space and then, owing to long absence from home, unworthily forgotten. A new book! The title, as is usual, gives little information of its contents, precise contents. The preface, if there be one, may be more informative, it may not. Then come the headings of the chapters, which may lead to something good. Chapter VII in this book is entitled "The Kentish Buccaneers." That heading calls to mind that in my early days seventy years ago there were magazine rumours of a "factory" at Canterbury, for the manufacture of British examples of *lathonia*, *niobe*, *pityocampa*, *satura*, *fraxini*, *peregrina*, *ononaria*, *dapidice*, *lunaris*, etc. One can read up here the whole sordid game and the names of those engaged in it, and then one can call to mind what numbers of these and other species exist in old collections, which have come under the hammer and got dispersed into some of our more recent collections of rarities. The next chapter, VIII, headed "Indoor Collecting," carries on this phase of collecting to a more recent date, illustrated by collections often dispersed in the old "Stevens Sale Room." All this is written in good literary style interspersed with verse here and there, and based on printed records in early magazines show out the craft of so many of the early dealers. Chapter VI, "Insect Psychology." "Larvae cannot think for themselves." *Instinct* is discussed at length and quotations from many who have written on it are included. Chapter V, "The Way of a Moth with its Mate," covers the question of Scent in Moths, the habits of Assembling and the Attraction of Sugar, ending with verses, "The Song of the Sugarer":

I like to chase *machaon*
 As it sails along the fen;
 I like to catch *blandina*
 In her rushy mountain glen;
 I like to pit my legs
 Against *edusa's* headlong flight;
 To circumvent *A. iris*
 In a wood is my delight.
 But how can these
 Enjoyments please
 Like sugaring in a woodland
 When the wind is warm and light?

Chapter II, "Cannibals and Hibernators," is full of hints on breeding results under different methods, dealing with many species; a most useful practical chapter. Chapter III, "Survival Factors," discusses aught that will facilitate successful breeding and aught that will be detrimental to successful results with various species. Another practical chapter written in a chatty attractive style. In fact this book is the result of actual personal, practical experiences of success and failure, and in no way a compilation made by others in geographical surroundings unknown to the author. There are more than 300 pages of really useful information at a small figure, which should be in the hands of the really earnest student of Nature's ways.—HY. J. T.

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 III. Asymmetry in Genitalia of Lepidoptera, to face page 109.
 IV. Early Stages of Oriental Palaearctic Lepidoptera, to face page 111.

SUPPLEMENT.

The British Noctuae and their Varieties, Vol. III, p. (133) - p. (172).

As we go to press we regret to hear that our "Editor Emeritus," G. T. Bethune-Baker, has passed away. He was 89 in July.

Hadena, Ochs. & Tr. (1816-25), Wood, Dup., H.-S., Gn., Meyr., Stdgr., Splr., Cul. [*Crino*, Hb. (1821), Warr.-Stz., Drdt.-Stz.: *Eumichtis*, Hb. (1821), Sth., Hamp.: *Eurois*, Hb. (1821), Barr.: *Polia*, Ochs. & Tr. (1816-25), Meyr.] *adusta*, Esp.

Tutt, *Br. Noct.*, 74 (1892): Meyr., *Handb.*, 130 (1895): Barr., *Lep. Br. Is.*, IV, 177, plt. 152, 2 (1897): Stdgr., *Cat.*, IIIed., 171 (1901): Hamp., *Lep. Phal.*, VI, 329, f. 108 (1906): Splr., *Schn. Eur.*, I, 190, plt. 40, 1 (1907): South, *M.B.I.*, I, 260, plt. 121, 3-4 (1907): Warr.-Stz., *Pal. Noct.*, III, 131, plt. 31c (1910): Culot, *N. et G.*, I (1), 150, plt. 27, figs. 5-8 (1910): Meyr., *Rev. Hand.*, 135 (1928): Drdt.-Stz., *Pal. Noct. Supp.*, III, 139, plt. 17i (1934).

Ernst & Engram., *Pap. d'Europ.*, VII, fig. 457a, b, c, d (1790), which they said was either the *anceps* or the *perplexa* of the *Verz.*, Schiff.

Esper, *Abbild. Noct.*, IV (1), 483, plt. 149, 1-2 (1789+?), gave two figures which are taken as the typical form, reddish-brown, mottled with blackish, some markings lighter. Werneb., *Beitr.*, II, 45 (1864), called it the *satura* of Schiff., i.e. the *adusta* of Treit. On plate 129, L, *l.c.*, he figured an insect which he called *accipitrina*, which Werneb. said was *saportae*, and if not was either a var. of *adusta* or of a small *persicariae*.

Hübner's fig. *valida*, Hb., *Samml. Noct.*, 606-7-8 (1809-13) is much darker than the British race, while the two specimens I have from Vienna seem to be intermediate between these two figures, Hübner's and Esper's. Esper's is very rough but in general appearance agrees with fig. Hb. 606.

Wood, *Index Ent.*, 49, plt. 12, f. 235 (1834), gave a dark figure with only a few traces of light (not whitish) colour. Stephens, *Illus.*, called this lighter coloration "flavescent."

Dup., *Hist. Nat. Supp.*, III, 233, plt. 22, 1 (1836), gave a very good figure of the usual continental somewhat lighter form, ♂. His previous figure and description was in *l.c.*, VI, 316, plt. 92, f. 6 (1826), a dark figure, ♀.

Freyer, *Neu. Beitr.*, I, 119, plt. 43, 1 (1833), gave a good figure of a form of this species under the name *vulturina*.

H.-S., *Sys. Bearb.*, II, 280, fig. 403 (1849), gave a figure of his var. *vulturina* (on plate), *vulturinea* (in text) (1850), which is "flavescent" and "not essentially different from *adusta*," p. 280.

H.-S., *l.c.*, fig. 497, gave a figure labelled *pavida*, Bdv., as a species, of which he said, "I doubt the specific difference of this form of *adusta*, because only the colour is divergent." Of the figure 497 he said, "fusca, cinereo, et purpurascenti mixta, linea-undulata acute nivea." "The hindwings are whiter than in the males of *adusta*." The figure has a very light ground hindwing with broad dark outer margin clearly bounded on the inner side by a narrow strip of the light ground, itself succeeded by a narrower strip of dark banding.

Stdgr., *Cat.*, IIIed., 171, gave as Syn. *vulturina*, Frr., *vulturinea*, H.-S., *valida*, Hb., and *septentrionalis*, Hoff. & K. Treated *baltica*, *pavida* (*chardinyi*) [al. ant. multo obscurioribus albo variegata], *sylvatica* [*grisea*], *vicina* and *moesta* [minor, multo obscurior al. ant. nigrican.] as forms of *adusta*.

Barrett on plate 150 gave four figures of *adusta*. 2b is supposed to represent a rich purple-brown form, having a subterminal line thickened

and spread into a beautiful zig-zagged yellow stripe, but the colour is not a beautiful purple-brown, and there is a dirty white line certainly not zigzag.

Splr., *Schm. Eur.*, I, 190, plt. 40, 1 (1907), gave a fairly dark figure not coloured as the typical dark form.

South, *M.B.I.*, I, 260, plt. 121, 3-4 (1907), gave two figures, a dark rich purplish-brown ♀, a male a pale grey colour with marking clear and distinct. The figures are good. The ♂ is an unusually light form.

Warr.-Stz., *Pal. Noct.*, III, 131, plt. 32c (1910), gave figures of *adusta* ♂ and ♀, both dark and of *vulturina* a paler grey-brown form; not a good figure.

Culot, *N. et G.*, I (1), 150, plt. 27, figs. 5 *adusta* and 7 *pavida*, both very good. The typical form has a very light reniform and anal angle blotches. The *pavida* is small.

Drdt.-Stz., *Pal. Noct. Supp.*, III, 139, plt. 17i, gave figures of *vicina* and *moesta*.

Of the Variation Barrett wrote:

Variation appears to be somewhat climatal, or at any rate local. In Suffolk there seems to be a slight tendency to a greyer-brown; but it is more to the North that the most pronounced variation is found. In Scotland from the southern border throughout the Midland, Eastern and Western districts of that country, especially in the large woods, heaths, and mountain districts, forms are found, often in abundance, having the chocolate-brown colour enriched, or otherwise clouded and partially obliterated, with black in varying degrees, sometimes obscuring or concealing, wholly or partially, the transverse lines, and in some instances having no marking distinctly visible except the whitish streaks in the reniform stigma, which are exceedingly constant. Similar specimens are found in the Orkneys, and Mr McArthur has brought one specimen thence, which is almost entirely velvety-black. In Shetland there is an intermingling of forms, some being like those from the South of England, others black-brown, with pale stigmata, whitish transverse lines, sometimes broadly so, and the nervures yellowish or whitish; others of a very rich red-brown and some of pale brown colour with markings sharply red-brown and black. Another variation, noticed in the North of Scotland by the late F. W. Buchanan White, shows great instability in the orbicular stigma, which ranges from circular to an elongated pear-shape. A specimen in Mr A. Horne's collection, and taken in Perthshire, is almost devoid of the red colouring, and is grey-brown, and very much like *Mamestra brassicae*. It is curious that in the South of Yorkshire, whence so many dark forms are obtained, and specimens of the present species occur quite as black as any of the ordinary Scottish. One captured near Huddersfield by Mr G. T. Porritt and in his collection, is of the southern type, yet of a richer purple-brown and having the sub-terminal line thickened and spread into a beautiful zigzagged yellow stripe. In Ireland the range of colour is from rich chocolate-brown to black-brown.

The Names and Forms to be considered:

adusta, Esp. (1789+?), *Abbild. Noct.*, IV, 483, plt. 149, 1-2.
porphyrea, Scriba (1791), *Beitr.*, II, p. 145, plt. x, 4. Syn.
aquilina, Bork. (1792), *Naturg.*, IV, 381. Syn.

- f. *duplex*, Haw. (1809), *Lep. Brit.*, 190.
valida, Hb. (1809), *Samml. Noct.*, IV, 606-8. Syn.
satura, Steph. (1829), *Ill.*, II, 181. [Syn. of *duplex*, Haw.]
f. *vulturina*, Frr. (1833), *New. Beitr.*, I, 119, plt. 63, 1.
f. *chardinyi*, Dup. (1836), *Hist. Nat. Supp.*, III, 231, plt. 21.4.
anilis, Bdv. (1840), *Ind. Meth.*, 127 [not an *adusta* form].
r. *pavida*, (Bdv., 1840) Culot (1910), *Ind. Meth.*, 120: *N. et G.*, I (1), 150.
baltica, Hering. (1846), *Stett. e. Ztg.*, 237. [Syn. of *vulturina*, Frr.]
vulturina (ea), H.-S. ? (1850) (? 1845), *Sys. Bearb.*, f. 403 [Syn. of *vulturina*, Frr.] ?
sylvatica, Bellier. (1861), *Ann. S. Ent. Fr.*, 29, plt. 2, 11 [=a form of *anilis*, Bdv.]
r. *vicina*, Alph. (1882), *Mem. Rom.*, V, 163. (*Her. Ross.*, XVII, 67.)
ab. *virgata*, Tutt (1892), *Brit. Noct.*, III, 74.
griseus, Stndf. (1893), *Berl. e. Zt.*, 361 [= *sylvatica*, Bell.]
r. *septentrionalis*, Hoffm. (1893), *Stett. e. Ztg.*, LIV, 128.
r. *moesta*, Stdgr. (1897), *Iris*, X, 335.
ssp. *bathensis*, Lutz. (1901), *Ent. Zt.*, XIV, 162.
ab. *aterrima*, Const., *Att. Soc. Nat. Mod.* (5), III, 15 (1916): Seitz (1934), *l.c.*, iii, 139.
r. *carpathica*, Kauck. (1922), *Pols. Pism. Ent.*, I, 39.
ab. *ochrea*, Lenz. (1927), *Osth. Schm. Sudbay.*, II (2), 331.
ssp. *juldussica*, Drdt.-Stz. (1934), *Supp. Pal. Noct.*, III, 139.
ssp. *lappona*, Rangn. (1935), *Ent. Rund.*, LII, 233.
ab. *albilinea*, Hoffm. (1938), *Dansk. Stors.*, III, 310, plt. vi, 21.

The Nomenclature and Identification of the various forms of this species has been found, and is, most intricate and difficult. Perhaps the clarification given in Seitz's 2 volumes, the Main and the Supplement, may help.

Warr-Seitz, *Pal. Noct.*, III, p. 131 (1910), before the variety craze came fully into the problem, and also great increase in the use of genitalia as a specific character, put the matter thus:—*Crino adusta*, Esp. (*porphyrea*, Bork. (Scriba); *aquilina*, Brk., and *valida*, Hb., as synonyms). f. *vulturina*, Frr. (*pavida*, Bdv., *chardinyi*, Dup.). *duplex*, Haw. (*satura*, Steph.). *sylvatica*, Bellier. (*griseus*, Standfs.). *septentrionalis*, Hoffm. *moesta*, Stdgr. *vicina*, Alph. [*anilis*, Bdv. (*albescens*, Gn.)] is a species.

NOTE.—[The Bdv. named *pavida* was a mere catalogue name from the *Index Methodicus* of Boisduval, 1840, without description and thus not valid. Bdv. indicated that *pavida* was the *chardinyi*, Dup.]

Draudt-Stz., *Pal. Noct. Supp.*, III, 139 (1934), corrected Warr-Stz. and brought the matter up to date. They pointed out that *pavida*, Bdv., was not synonymous with *vulturina*, Frr., and had never been correctly described, but that Culot, *N. et G.*, had since given a description and figure (1910). *pavida*, (Bdv.) Culot (nec H.-S.). *virgata*, Tutt, f. 171. ? *vulturina*, H.-S. (1845), displaced *baltica*, Hering (1846), but was a Syn. of *vulturina*, Frr. (1833). *septentrionalis*, Hoffm. *carpathica*, Kauchi. *aterrima*, Costm. *juldussica*, Drdt.-Stz. [*sylvatica*, Bell. (=a form of *anilis*)], a species. *moesta*, Stdgr. is not *septentrionalis*, 171. *vicina*, Alph., fig. 171. [*anilis*, Bdv. (not an *adusta* form)], a species.

NOTE.—[The three synonyms of *adusta* are accepted, viz., *porphyrea*, Bork. (Scriba), *aquilina*, Bork., and *valida*, Hb. The *chardinyi*, Dup., is unnoticed: *duplex*, Haw. (*satura*, Steph.), is accepted.]

Tutt dealt with: (1) the typical *adusta*, reddish-brown, mottled with blackish, with distinct markings; (2) brownish-black or blackish-fuscous, markings moderately distinct, *duplex*, Haw.; (3) pale reddish-brown, very distinctly marked, ab. *virgata*, Tutt.

He also included *baltica*, Hering, now declared a species, and ab. *satura*, Stephens, only a somewhat more unicolorous *duplex*, Haw., and now dropped by authors.

f. *valida*, Hb., *Samml. Noct.*, 606-7-8 (1809-13), *Text*, p. 193.

ORIG. DESCRIP.—“Thorax deep brown: the forewings dusky, overlaid with a few pale spots and scattered marks and a species marked with both waved and dotted black: the hindwings dull rough scaling. The abdomen also dull-grey.” Syn. *adusta*, Esp.

Herr. Ochsenheimer considered this, *valida* and also *satura* for a single species, they are almost similar to one another.

f. *vulturina*, Frr., *Neu. Beitr.*, I, 119 (1833).

FIG.—l.c., plt. 63, f. 1.

ORIG. DESCRIP.—“It is extraordinarily like the Noctuid *adusta*, it also resembles and comes very near *thalassina*. Its wings are longer and narrower. Head, thorax and forewings are of a black-brown ground colour, darker than that of *adusta*. The markings are wholly like those of *adusta*, only the dark sagittate marks between the veins are red-brown, but in *adusta* the orbicular is indistinct. The hindwings of the ♂ of *vulturina* are white-grey suffused on the fringes and have a narrow curved line. On the underside there is on the forewings of *adusta* more seal-red colour, while *vulturina* appears more black-brown. In *adusta* the abdomen is reddish-grey, in *vulturina* black-grey. These are, as I have said, two very closely allied insects, and only when one has the two for comparison can one appreciate a distinct difference.” Herr Dahl's collection.

race *chardinyi*, Dup., *N.H. Lep. Fr.*, Supp. III, 231 (1836).

FIG.—l.c., plt. 21, f. 4.

ORIG. DESCRIP.—“The upper side of the forewings is of a brownish-violet, with ferruginous clearings in the centre. Each of these is traversed by three lines, of which two are grey and one white; the first from the base is waved and bordered with black on the outside; the second, also bordered with black, but inside is sinuous and dentate as a saw with a white dot at the end of each tooth, the third is angulate and forms a well marked M at its middle. Against this last line on the inner side there lie a row of sagittate spots. There is also seen near the base the rudiments of a fourth line. The two ordinary stigmata, situated as usual between the two first lines are of a whitish-grey and finely margined with black. The reniform is regular the orbicular is misshapen and extends to the costa, where the end is marked by three white points. Below the orbicular a black mark is seen in the form of U sideways. The fringe is of the ground colour, dotted with white and separated from the margin by a thread of the same colour, preceded by

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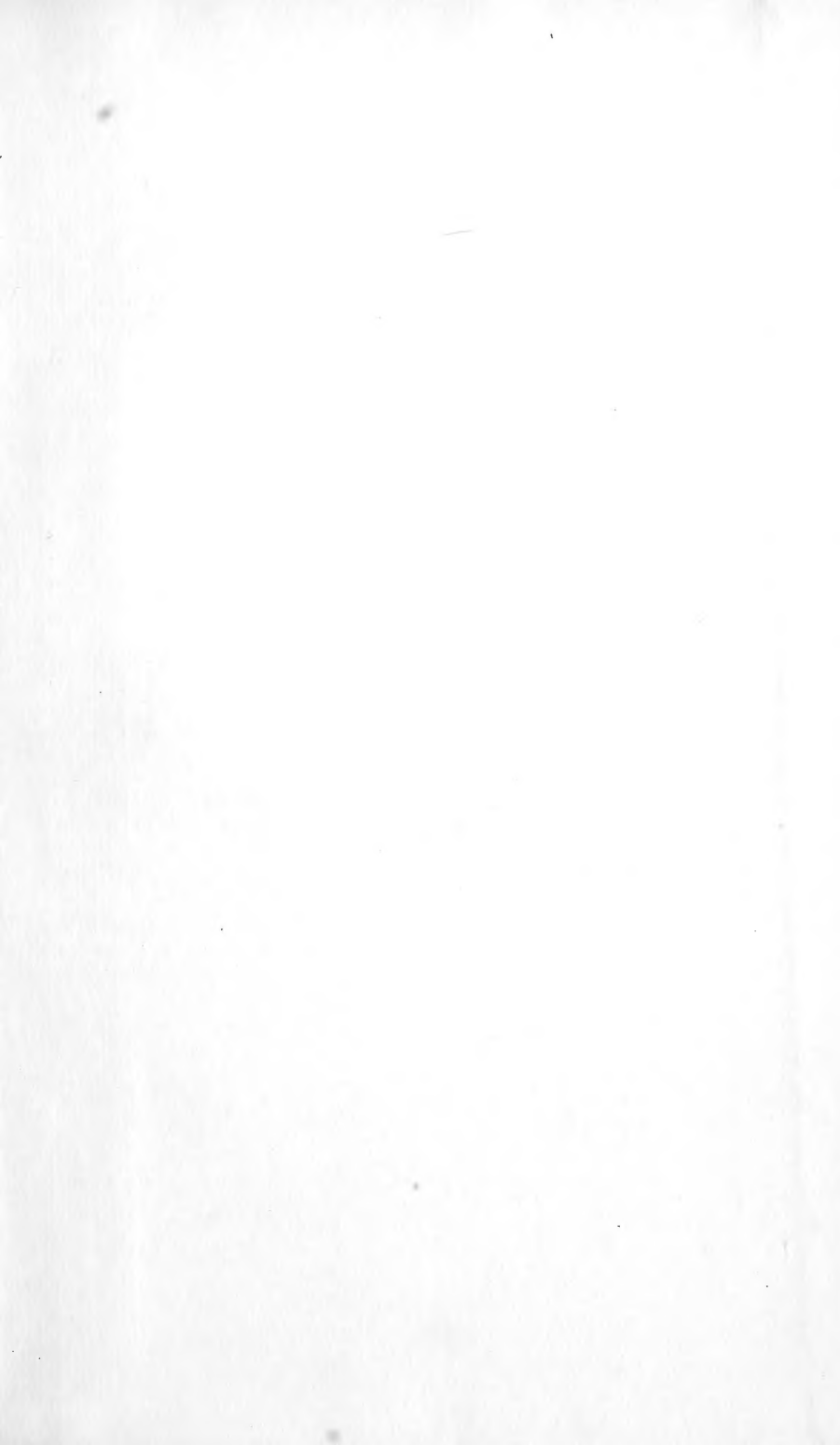
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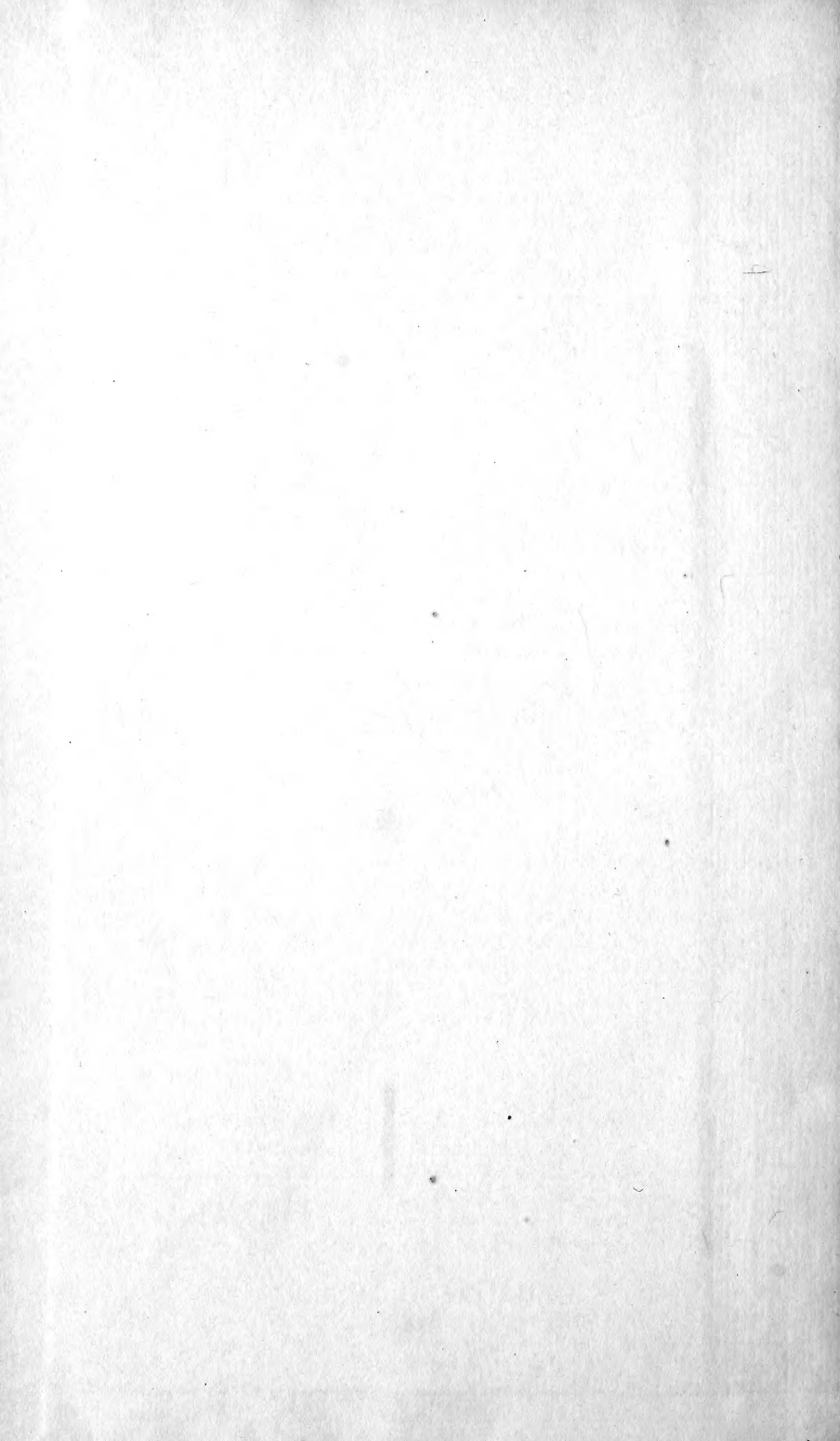
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